JOURNAL OF THE IRON AND STEEL INSTITUTE

VOLUME 164 1950

SUBJECT INDEX

[References to papers and articles given in full text are indicated by the word (*Paper*) following the page number.

Indexing of Alloy Steels and Other Alloys : In the indexing of alloy steels, carbon and iron are ignored and the alloying elements contained in the steel are arranged in alphabetical order ; for example, all references to nickel–chromium–molybdenum steel will be found under the heading chromium–molybdenum–nickel steel. In the indexing of other alloys, carbon and iron when present, are included in the title ; iron when present is always mentioned first and the other elements follow in alphabetical order, carbon being in all cases mentioned last. Examples : "Iron–silicon–carbon alloys" and "iron–chromium–nickel–carbon alloys."]

Ablett Prize, award for 1949, 476
" Abraser " Tester, 242
Abrasives, for metal polishing, 111 ; superfinishing, 239
Absorptiometric Analysis, determination of chromium, 250 ; high-speed tool steels, 250
Acicular Fracture in Hadfield Steel, 234
Acid Electric Furnace, 486 ; oxygen in, 487
Acid Electric Steel, use of electrolytic manganese, 107
Acid Open-Hearth Furnace, 486
Acid-Resisting Alloy, corrosion products, electron-diffraction study, 124
Acid Slags, electric, 486 ; open-hearth, fluidity, 231 ; spectrographic analysis, 381
Adsorbed Films, phase changes, 376
Adsorption Capacity, relationship with corrosion, 380
Ageing, relation to Portevin/Le-Chatelier phenomenon, 116
Agglomeration, influence on blast-furnace charge, 104 ; iron ore at Diósgyör, 481 ; of iron ores by partial reduction in hydrogen, 105. *See also* Sintering
Air, determination of carbon dioxide in, 252 ; determination of hydrocarbons in, 252
Aircomatic Welding Process, 370
Aircraft Metals and Alloys, dynamic torsion, 121 ; under stratospheric conditions, 120
Aircraft Steels, effect of chromium plating on endurance, 503
Alaska, coal washing, 356
Al-Fin Bonding Process, 112
Aliquippa Works, 360
Allegheny Ludlum Steel Corporation, hot-drawing drill rod, 235
Allencote Chrome-Ore Coatings, 228
Alloy Cast Iron, for internal-combustion engines, 378
Alloy Phases, effect on mechanical properties, 374 ; spectrographic study, 381
Alloy Properties, 375
Alloy Steel, attack of hydrogen/nitrogen mixtures, 507 ; austenitic, effect of elements on properties, 244 ; austenitic, isothermal decomposition, 505 ; austenitic, transformations, 506 ; cast, structure and grain-size, 122 ; chi phase, 506 ; composition survey, 105 ; crack propagation, 116 ; determination of carbon in, 250 ; developments and
Alloy Steel—*continued.*
testing, 245 ; heat-treatment of large castings, 108 ; isothermal decomposition of austenite, 505 ; mechanical properties, influence of excessive reheating temperatures, 37 (*Paper*) ; off heats, 360 ; overheating and burning, influence of excessive reheating temperatures, 37 (*Paper*) ; SAE, core- and case-hardening properties, 377 ; spot tests, 252 ; structure, influence of excessive reheating temperatures, 37 (*Paper*)
Alloy-Steel Sheets, arc welding, 369
Alloys, aluminium–cobalt–nickel powder, magnetic properties, 374 ; aluminium–nickel powder, magnetic properties, 374 ; copper–tin, in electroplating, 112 ; iron–aluminium–chromium, cold-rolled strip, 245 ; iron–aluminium–chromium–silicon, magnetic properties, 374 ; iron–aluminium–nickel, microscopical studies, 122 ; iron–aluminium–nickel, orderly precipitation, 505 ; iron–carbon, electron-microscope study, 246 ; iron–carbon, influence of small amounts of certain elements on microstructure (*Paper*), 407 ; iron–carbon, structure, 378 ; iron–chromium, magnetic investigations, 374 ; iron–chromium–nickel, electrical resistivity at high temperatures, 243 ; iron–chromium–nickel, hardness, 243 ; iron–cobalt, magnetic field and recrystallization, 378 ; iron–cobalt, magnetic properties, 117 ; iron–nickel, Curie-point displacement, 243 ; iron–nickel, effect of stress on electromotive force, 242 ; iron–nickel, effects of stress and deformation on martensite transformation, 506 ; iron–nickel, electrical resistivity at high temperatures, 243 ; iron–nickel, magnetic properties, 117, 503 ; iron–nickel, substitution by iron–chromium, 374 ; iron–vanadium, 153
Alloys, Complex, electron-microscope study, 246
Alloys and Metals, 510 (*Book*)
Alpha Iron, precipitation of carbon and nitrogen, 505
Alternating-Current Bridges, imbalance determination, 483
Alternating-Current Electroplating Process, 239
Alumina, determination in silica brick, 252 ; determination in steel, 251
Alumina–Lime–Silica Slag System, X-ray study, 231
Aluminium, bonding to steel, 112 ; casting (*Book*), 384 ; crystal-lattice-constants measurement, 505 ; determination in silica refractories, 252 ; determination by spectrography, 250 ; effect in high-hardenability cast steels, 376 ; effect on microstructure of cast iron, 412 ; effect on microstructure of iron–carbon alloys, 410 ; effect on steel hardenability, 116 ; influence on steel grain-size, 244 ; sprayed steel coatings, 497 ; welding by Aircomatic process, 370
Aluminium Alloys, in cathodic protection, 380
Aluminium–Cobalt–Nickel Alloys, powder, magnetic properties, 374
Aluminium–Nickel Alloys, powder, magnetic properties, 374
Aluminium Powder, in bitumen protective paints, 113
Aluminium Silicate Refractories. *See* Refractory Materials.
Aluminium–Steel Trolley Wire, 376
Aluminium–Vanadium System, 157
American Steel and Wire Co., drawing stainless steel wire, 236
Ammonia, determination in producer gas, 252
Amsler Testing Machine, modifications, 500
Analysis, 125, 249, 381, 508 ; absorptiometric, 250 ; chromatographic, for gas, 252 ; colorimetric, 251 ; electrographic, 381 ; emission-spectra in Russia, 251 ; interferometric, of argon/nitrogen mixtures, 508 ; microchemical, sampling device, 250 ; photocolorimetric, of stainless steels, 381 ; polarographic, 251 ; polarographic, mercury drop electrode, 508 ; reproducibility, 249 ; in Russia, 250 ; spectrochemical, 125, 251 ; spectrographic, 250, 382 ; spectrographic, quantometer adapter, 251 ; spectrographic, of slags, 381 ; spectrographic, statistical analysis, 508 ; spectrum, 251 ; spectrum, cementite and iron lines, 381 ; spectrum, of low-alloy steel, 381 ; spectrum, open-hearth slags, 381 ; spectrum, sparking effect,

Analysis—*continued.*
381; spectrum, sparking and third elements, 508; spectrum, sudden changes in lines, 251; steeloscope, 125
Analysis of Aluminium Silicate Refractories, 382
Analysis of Blast-Furnace Slag, semi-microchemical method, 252
Analysis of Combustion Flue Gases, instruments for, 382
Analysis of Gases, 252
Analysis of Silica Refractories, 252
Analytical Methods at Richard Thomas and Baldwins, Ltd., 128 (*Book*)
Anglo-Saxon Smith In About A.D. 1000, 253
Annealing, automatic, of welded pipes, 108; blackheart malleable, effects of temperature and silicon, 363; controlled-atmosphere, of malleable iron, 363; diffusion, effect on structural steel, 500; induction, of light stampings, 234; induction, of sheet metal, 491; malleable-iron castings in electric furnace, 489; strength-reducing, of low-carbon strip, 108
Annealing Furnaces, gas-fired, 491; Whiting-Cole, refractory practice, 358
Annealing Plant for Mild-Steel Sheets and Coils, design and operation, 87
Annealing Pots, for malleable iron, 364
Annealing Properties of Low-Boron Steel, 244
Anthracite, blending with coking coals, 482; determination of sulphur in, 382; La Thuile, in blast-furnace charge, 105
Anti-Fouling Compositions, leaching rate and behaviour, 113
Anvils, hammer, large, forging of, 235
Aqueous Solutions, dilute, thermodynamics, 511 (*Book*)
Araldite Resin Coatings, 497
Argentine, steelmaking with high-phosphorus pig, 361
Argon-Arc Welding, 238
Argon/Nitrogen Mixtures, analysis by interferometer, 508
Ariz Manganese-Ore Deposits, 227
Armco Iron, salt-bath chromizing, 495
Armour-Plate Steel, industrial uses, 377
Armour Research Foundation, magnetic recording media, 375
Arsenic–Vanadium System, 158
Atlantic Steel Co., unit-load principle, 383
Austenite, breakdown below Ms temperature, 27 (*Paper*), 506; decomposition in steel, 506; isothermal decomposition, 505; isothermal transformation, acceleration of rate, 165; isothermal transformation in chromium magnetic steel, 123; transformation, 247; transformation in chromium stainless steel, 379; velocity of solution of carbide phase, 247
Austenite–Martensite Transformation, 506; kinetics, 247
Austenitic Alloys, transformations, magnetic study, 506
Austenitic Grain-Size, determination in cast steel, 378
Austenitic Stainless Steels, effect of testing speed on tensile properties of sheet, 114
Austenitic Steel, permeability, 243
Austenitic Transformation, chromium stainless steels, 379
Austenitic Welding of Low-Alloy Steels, 238
Australia, metallurgical education, 253; steelmaking practice at Whyalla, 231
Australian Iron and Steel, Ltd., centrifugal casting of iron pipes, 233; tinplating at Port Kembla, 236
Australian Steel Industry, 230
Automatic-Control Applications in Open-Hearth Furnaces, 106
Automatic Regulators, Russian, 237
Automobile Finishes, Metallichrome coating, 240
Automobile Manufacture, metallurgical aspects, 509
Automobile Parts, case-hardening by gas-cyaniding, 235
Avery, W. and T., Ltd., testing machine, 371
Babcock and Wilcox Tube Co., tube reheating furnace at Beaver Falls, 107
Back-Pull Wire Drawing, 491; industrial technique, 236; Pathfinder machine, 236
Bainite, formation in steels, 505
Balance, adsorption, for determination of gaseous corrosion, 507
Ball-Bearing Plant, waste-liquor disposal, 253
Ball Bearings, electric-furnace hardening, 491
Ball Mill, vacuum, for gas extraction, 251
Band Sawing Stainless Steel, 493
Banding, micro-radiographic investigation, 123
Bars, prevention of fin formation in rolling, 109; round, residual stresses, 502
Baryta Carbon-Determination Method, modifications, 508
Basic Open-Hearth Furnace, effect of oxygen on refractories, 358
Bauxite, effect on desulphurization in open-hearth, 486; reduction of iron from, in Hungary, 359
Beams, roll design, 236
Bearing Balls, electric-furnace hardening, 491
Bearings, lubrication conditions, 109; sleeve, developments, 369; surface roughness in relation to oil-film thickness, 109
Bedeaux System, 383
Bend Tests, butt-welded steel, 371; haulage-cable wires, 373
Bend-Testing Machine, 500
Bending, plastic, 500; plastic, deformation during, 500
Bending Strength, static, determination, 241
Bending Stress, testing corrosion resistance under, 124
Benzylcellulose, as protective coating, 113
Bessemer Converter. *See* Converters
Bessemer/Electric-Furnace Process, at Hüttenwerk Huckingen A.G., 231
Bessemer Gold Medal, award for 1950, 475
Bessemer Practice, manganese economy, 360
Bessemer Process, behaviour of nitrogen, 230; blowing-time control by flame-spectrum assessments, 230; flame radiation, 230; practice at Corby, 105; production of low-nitrogen steel, 230
Bessemer Steel, low-carbon, effect of production practice on creep, 243; low-nitrogen, production, 230
Bethlehem Steel Co., Sparrows Point plant, 360
Bibliographies, heat transmission in metallurgical furnaces, 365; metal cleaning, 495; resistance welding, 238
Binary Metallic Systems, accuracy of solubility limits, 247
Biographies, *frontispiece, also to face* 128, 256, 384; contributors to *Journal*, 94, 95, 224, 350, 351, 476, 477
Bismuth, spot test, 508
Bitumen Paints, containing aluminium powder, 113
Bituminous Protective Coating, 113
Blacksmith's Manual (*Book*), 383
Blackheart Malleable Iron, effect of temperature and silicon content on annealing, 363
Blast-Furnace, alternatives for, 359; campaign of Tata "A" furnace, 104; carbon hearths, 358; charging, compensated, 105; charging tests on frustrum models, 180 (*Paper*); coke consumption, reduction by limestone addition to sinter, 105; coke consumption, reduction in small furnaces, 359; coke, effect of quality on operation, 105; comparison with electric low-shaft furnace, 359; compensated charging, 105; design, progress and problems, 104; distribution, 105; distribution control by top modification, 173 (*Paper*), 485; experimental, 359; flue-dust deposition, 229; flue-dust nodulizing, 355; flue dust, rotary sintering in Luxembourg, 356; gas velocity, 360; large, operation, 229; linings, occurrence of cordierite, 229; low-shaft, oxygen-enriched blast, 359; maintenance at Appleby-Frodingham, 485; materials balances, determination of error sources, 229; modification for controlled distribution, 173 (*Paper*); oxygen-enriched blast, 359, 360; oxygen-enriched blast, effects in tuyere zone, 359; performance, effect of agglomerated ore, 104; performance, effect of coke density, 229; performance, effect of coke permeability, 229; performance, effect of coke quality, 105; performance, effect of gas/solid temperature differences, 129 (*Paper*), 485; performance, effect of sinter properties, 229; process, 485; shell plates, welded, 369; shells, deformation during welding, 238; shells, welded, 238; small, reduction of coke consumption, 359; stock-rod gas seal, 360; sulphur control, 105; throat diameter, effect of fines, 229, 485
Blast-Furnace Auxiliaries, maintenance, 485
Blast-Furnace Brick, disintegration testing, 358
Blast-Furnace Gas, calculation of particle motions, 294 (*Paper*); cleaning, 294 (*Paper*), 357; cleaning-plant performance, 305 (*Paper*); electrostatic cleaning, 356; impurities, 305; preheating by boiler-flue waste heat, 103; sampling and dust analysis, 324; temperature differences in relation to solids, effect on operation, 129 (*Paper*), 485; transit time, determination by radio-active tracers, 229; velocity in shaft, 360; washing-water treatment, 356
Blast-Furnace Practice, 104, 229, 359, 485; at Fontana, 360; with large furnaces, 229
Blast-Furnace Slag, analysis, 252; building materials from, 360; determination of sulphur in, 508; fluidity at low temperatures, 360; hydraulic binders from, 360; paving-blocks from, 360; viscosity, 229
Blast-Furnace Stoves, rapid-heating tests, 485; variable-turbulence, Denain trials, 485
Blast-Furnace Thermodynamics, 359
Blast-Furnace Top, frustum models, experimental tests, 180 (*Paper*); modification for controlled distribution, 173 (*Paper*), 485
Bliss, E. W. Co., casting practice, 233
Blow-Holes, in castings, influence of hydrogen, 233
Boiler Feed Pumps, corrosion-erosion tests, 125
Boilers, brittleness determination, 248; corrosion damage, 248; flue-gas deposits and corrosion, 381; marine, deterioration, 380
Boiler Tubes, corrosion, 248
Boiler Water, determination of excess phosphate in, 382
Bolts, tungsten carbide tooling, 491
Bolts and Nuts, photoelastic stress patterns, 121
Bonding, Al-Fin process, 112; steel to aluminium, 112
Bonding Cores, 232
Book Notices, 128, 253, 383, 510
Borg-Warner Corporation, production carburizing, 490; salt-bath furnaces for wire, 490
Boron, effect on cast-iron structure, 121; effect on mechanical properties of low-alloy steels, 245; effect on steel hardenability, 116; effect on steel properties, 244
Boron–Titanium Steels, for moderate temperatures, 119
Boundary Lubricants, anti-seizure properties, 109

Brandenburg Steelmaking Process, 230
Brazil, coal industry, 356; manganese deposits, 481; manufacture of steel hoes, 109
Breakdown of Austenite Below M_S Temperature, 27 (*Paper*)
Bridges, A.C., imbalance determination, 483
Brinell Hardness, as function of plasticity parameters, 116
British Iron and Steel Research Association, committee-organization chart, 326; open-hearth charging studies, 361
British Welding Research Association, research in welding, 492
Brittle Fracture, isotropy of rolled steel in relation to, 501; of mild-steel plating, 241; prevention in welded structures, 238; in welded structures, 242
Brittleness, choice of test, 242; cold, testing, 503; determination in boilers, 248; low-temperature, effect of hydrogen, 244; low-temperature, effect of surface condition, 241; low-temperature, of stressed steel, 241; in mild steel, 163; reversible development, 244; temper, carbide distribution as possible cause, 1 (*Paper*), 503
Buckle Flame-Cutting Torch, 238
Building Materials, production from blast-furnace slag, 360
Bulk Handling of Scrap in Steelworks (*Paper*), 452
Bullard-Dunn Tinplating Process, 239, 496
Burma, tin and tungsten ore deposits, 227
Burning and Overheating of Steel, detection by microscopy, 46 (*Paper*), 505
Butt-Welded Steel, bend tests, 371

Cable Wire, bend tests, 373
Cadmium, attack by moist halogen vapours, 125; as intermediate layer in chromium plating, 496
Cadmium–Zinc Coatings, deposition and properties, 497
Calcium, determination in silica refractories, 252
Calcium Carbide, determination in slag, 381
Calcium Carbonate, influence of corrosion on thermal deposition, 248
Calcium Hypochlorite, in treatment of plating wastes, 112
California, manganese-ore deposits, 227
Canada, applicability of Wiberg-Söderfors sponge-iron process, 105
Canning Technology (*Book*), 383
Carbide Distribution, as possible cause of temper brittleness, 1 (*Paper*), 503
Carbide Phase, velocity of solution in austenite, 247
Carbides, in chromium–tungsten–vanadium steels, 247; interplanar spacings in steels, 247; in vanadium high-speed steels, 247
Carbon, behaviour in fireclay, 228; determination in iron, 252, 382; determination in iron alloys, 508; determination in steel, 250, 382, 508; diffusion, 257 (*Paper*); effect on temper brittleness, 117; precipitation in alpha iron, 505; reaction in steelmaking, 106; as source of enamelling defects, 499
Carbon Absorption, in cupola model, 362
Carbon Dioxide, determination in air, 252; determination in carbonates, 508
Carbon-Equivalent Value of Cast Iron, relationship with properties, 377
Carbon Hearths for Blast-Furnaces, 358
Carbonates, determination of carbon dioxide in, 508
Carbonization Effluents, determination of *p*H, 509
Carburetting, open-hearth, with pulverized coal, 361
Carburization, of molten steel, 106; phenomena in burnt steel petrol tank, 253; of steel, 257 (*Paper*)
Carburized Sintered Steel Parts, properties, 370
Carburizing, at Borg-Warner Corporation, 490; in crankshaft heat-treatment, 491; gas, continuous, 490; gas, at Nash-Kelvinator Corporation, 490; homogeneous, 234; McQuaid-Ehn test, 234; tests with coal powders, 365; theory and practice, 365
Carnegie-Illinois Steel Corp., cold-reduced sheet and tinplate production, 368; electric-furnace safety equipment, 486; electrolytic-pickling installations, 494; forging hammer anvils, 235; recording extensometer, 109; slab reheating furnace at Gary works, 107
Carnegie Medal, award for 1949, 475
Carpathia, coal resources, 227
Case Hardening, automobile parts by gas-cyaniding, 235; in cyanide salt baths, 235; nitrogen, effect of alloying elements, 366; properties of SAE alloy steels, 377; tests with coal powders, 365
Cast Crankshafts, fatigue strength, 115
Cast Iron, alloy, for internal-combustion engines, 378; as bearing material, 117; British, earliest use in machine construction, 406 (*Paper*); carbon-equivalent properties, 377; cooling rate and carbon saturation, 233; copper – chromium, graphitization, 244; determination of chromium in, 382; determination of magnesium by spectrography, 382; effect of boron on structure, 121; effect of iron oxide on microstructure, 412; effect of manganese, 378; effect of tungsten additions, 245; effect of zirconium, 376; electric-furnace application, 232; graphitization, controlled, 106; graphitization, effect of zirconium, 376; grey. *See* Grey Cast Iron; heat-resisting, 119; high-silicon, growth and scaling, 364; influence of small amounts of certain elements on microstructure, 407 (*Paper*); manganese sulphide inclusions, 413; microstructural diagrams, 365; modified, production, 232; nodular, British and American methods, 121; nodular, determination of carbon, 252; nodular, development, 377; nodular, experiments, 489; nodular, progress report, 106; nodulizing alloy, 489; production and uses in eighteenth century, 252; sliding properties, 117; spheroidal graphite, 489; "synthetic," production in electric furnace, 359; white, deoxidation, 363; white, effect of chromium on graphitization, 376 white, effect of deoxidation on graphitization, 363; white, effect of heating rate on graphitization, 363; white, graphitization behaviour, 363; white and special, for crushing machinery, 378
Cast-Iron Crankshafts, production, 364
Cast-Iron Flywheels, moulding and casting, 233
Cast-Iron Parts for Chemical Industry, production, 233
Cast Stainless Steel, magnetic properties, 503
Cast Steel, austenitic grain-size determination, 378; behaviour at high temperatures, 120; forging dies, 366; high-hardenability, effect of aluminium and vanadium, 376; low-alloy, dynamic and static properties, 501; solidification, 365; static properties, 377, 501
Casting, aluminium, 384 (*Book*); centrifugal, hot-tear prevention, 364; centrifugal, iron pipes, 233; continuous, theory, 233; high-silicon iron heater tube, 364; ingot, 231; iron flywheels, 233; open-hearth charging machine, 364; practice at E. W. Bliss Co., 233; precision, at Watervliet Arsenal, 239; roll grinder bed, 364; ships' equipment, 364; steel, behaviour of moulding sand, 490; steel wheel centres, 364; VLW process, 233
Castings, alloy steel, isothermal heat-treatment, 108; blow-holes, influence of hydrogen, 233; carburization of steel for, 106; comparison with welded parts, 238; design, 488; friction sawing, 365, 493; grey-iron chill promoting by tellurium, 365; grey-iron, production in mechanized foundry, 365; inspection by "black light," 372; inspection methods, 114; malleable-iron, electric-furnace annealing, 489; production at E. W. Bliss Co., 233; production by cement-sand process, 107; production organization and control, 488; radiography, 118; rat-tail defects, 489; solidification phenomena in manufacture, 107; steel, anti-piping compounds, 364; steel, examination by gamma radiography, 118; steel, horizontal, freezing mechanism, 91, 182 (*Paper*), 489; steel, machine moulding, 364; steel, production processes, 489; steel, solidification mechanism, 91, 182 (*Paper*), 489; steel, X-ray examination apparatus, 118
Cathodic Protection, 380; anode materials, 249; buried gas mains, 380; pipelines, engineering aspects, 507; pipelines in Iraq, 507; steel piling in sea-water, 507
Cement Sand for Moulds and Cores, 107
Cementation, gaseous, 490
Cementiferous Paints, zinc phosphate cements, 289 (*Paper*)
Cementite, influence on iron spectrum lines, 381
Centre National de Recherches Metallurgique, gas-analysis research, 250
Centrifugal Casting, iron pipes, 233; prevention of hot tears in tubes, 364
Centrifugal Lining of Pipe, concrete, 112
Centrifugal Purification of Oils, 237
Centrifugal Testing, metals and alloys, 376
Ceramics, powdered metals in, 500
Chaillac Iron-Ore Deposit, 227
Channels, roll design, 236
Charcoal, activated, in purification of nickel-plating baths, 496
Charging, open-hearth, 361
Charpy Specimens, 501
Chemical Industry, cast-iron parts, 233
Chemistry, dictionary, 255 (*Book*); inorganic, in Germany, 510 (*Book*)
Chi Phase in Alloy Steels, 506
Chrome-Magnesite. *See* Refractory Materials
Chromic-Oxide–Lime–Magnesia Ternary System, 358
Chromite, Californian deposits, 481; Pacific Islands deposits, 227. *See also* Refractory Materials
Chromite–Lime–Magnesia System, 483
Chromium, determination in acid slags by spectrography, 381; determination in cast iron, 382; determination in ferro-alloys by spectroscopy, 382; determination in ferrochromium, 249; determination by Spekker absorptiometer, 250; determination in steel, 250, 381, 382; hexavalent, in plating wastes, 112; identification by electrography, 381; influence on graphitization of white cast iron, 376; pickling by sodium hydride, 111
Chromium–Copper–Phosphorus System, X-ray study of phosphorus section, 506
Chromium Magnetic Steel, isothermal transformation of austenite, 123
Chromium – Manganese – Phosphorus System, X-ray study of phosphorus section, 506
Chromium–Manganese–Tungsten Steels, transformations, 506
Chromium–Molybdenum–Nickel Steel, production in electric furnace, 488; tensile and impact tests, 377
Chromium–Molybdenum Steel, chromium plating effect on endurance, 503; creep resistance, 376; fractures, 241; tensile and impact tests, 377

Chromium–Nickel Alloy, effect of temperature on plasticity limit, 115
Chromium–Nickel–Phosphorus System, X-ray study of phosphorus section, 506
Chromium–Nickel Steel, attack of hydrogen/nitrogen mixtures, 507; boron–titanium, for moderate temperatures, 119; spectrochemical analysis, 125; transformations, 506
Chromium Ore, Roumanian deposits, 227
Chromium Plating, cadmium as intermediate layer, 496; effect on endurance limit of aircraft steels, 503; effect on fatigue strength, 373; electrolytic degassing, 240; electrolytic polishing, 111; etched metal surfaces for electron microscopy, 122; hard, elastic modulus and strength, 496; hard, by superimposed high-frequency alternating current, 112; hard, wearing conditions and quality control, 112; Hausner process, 112; mechanism and characteristics, 495; microhardness testing, 239; milling-machine quills, 112; plant at Fescol, Ltd., 240
Chromium Steel, attack of hydrogen/nitrogen mixtures, 507; austenitic transformation, 379; corrosion in chemical plant, 380; effect of heat-treatment on magnetic properties, 117; effects of molybdenum and phosphorus, 120; fractures, 241; heat-treatment tests, 234; magnetic, isothermal transformation, 123; relation between chromium and carbon in refining, 487; unsuitable applications, 380
Chromium – Tungsten – Vanadium High-Speed Steels, vanadium carbide in, 247
Chromium–Vanadium Steel, effect of chromium plating on endurance, 503; suitability for hot and high-speed work, 243; tensile and impact tests, 377
Chromizing, salt-bath, of Armco iron, 495
Cincinnati Shaper Co., heat-treatment equipment and processes, 107
Clad Steel, chemical-plant applications, 377; production and uses, 112
Cladding, nickel, of steel plate, 496
Clay, colloidal, in foundry and refractory materials, 490; colloidal, in preparation of synthetic moulding sands, 490
Clay Binders for Moulding Sand, 490
Clay Substances in Moulding Sands, determination, 232
Cleaning, 111, 239, 494; castings by friction sawing, 365; in electroplating, 111; flame, in preparing steel for painting, 111; metal, bibliography, 495; previous to plating, 494; radio-active-tracer technique, 111; sheet-metal pressings before enamelling, 111
Cleavage Fracture In Shipbuilding Steels, 371
Cleveland-Cliffs Iron Co., spiral ore concentrator, 356
Clock Manufacture, metals in, 509
Cloth, impregnated, for protection of gas and water pipes, 112
Coal, bituminous, swelling, 103; bituminous, volatile content, 356; briquettes for gas producers, 482; briquetting by Dolni Rychmov method, 481; carbonization-assay apparatus, 103; classification for coking, 356; determination of sulphur in, 382; Illinois, preparation characteristics, 356; pulverized, for open-hearth carburetting, 361; Ruhr, coking heats, 482; use of enriched ash in refractories, 359; Virginian, carburizing properties, 481; washing in U.S.A. and Alaska, 356
Coal Deposits, Alabama, 482; Carpathia, 227; Colorado, 482; Hungary, 227; Mexico, 481; Pacific Islands, 227
Coal Industry in Brazil, 356
Coal-Preparation Plants, American, 356; hydraulic cyclones, 356
Coal Slurries, bituminous, froth flotation, 356
Coal Washeries, surface corrosion, 249
Coating Thickness, determination by X-rays, 495; meter, 495
Coating Weights, determination on electrolytic tinplate, 495
Coatings, Araldite resin, 497; bitumen, for gas and water pipes, 112; cadmium–zinc, deposition and properties, 497; corrosion-resistant, 495, 497; electrolytic polishing, 111; enamel. *See* Enamels; for gas and oil pipelines, 111; lacquer-paint, testing, 240, 499; manganese phosphate, 498; metallic, spectrum analysis, 251; organic, 113, 125 (*Book*); organic applications, 113; organic, development for special purposes, 113; organic, specification, 113; oxide, local-cell activity, 379; oxide, on metal surfaces, 506; phosphate, 497; phosphate, after-treatment with chromates, 498; phosphate, aids in drawing, 367; phosphate, electrodeposited, 497; phosphate, on iron and steel, 498; phosphate, recent developments, 113; phosphate, sorption, 498; protective, 111, 239, 495; protective bituminous, 113; protective, electrochemical studies, 141 (*Paper*), 499; protective, for exposed iron structures, 113; protective, FE-ISOL polyvinyl acetate process, 240; protective, formation kinetics, 498; protective glazes, 358; protective metallic, 495; protective synthetic-resin, 112; protective tin undercoats, 240; protective water-excluding, 113; sprayed, corrosion resistance, 497; sprayed polythene-resin, 497; sprayed steel on aluminium and magnesium, 497; thickness determination by X-rays, 495; thickness meter, 495; water-excluding, for protecting steel, 113
Cobalt, determination by Spekker absorptiometer, 250; identification by electrography, 381; in special steels and alloys, 245, 377
Cobalt-Base Alloys, determination of nickel in, 382
Cogging Mill, 367
Coils, heavy, handling machinery, 237
Cokability of Coals, assay apparatus, 103; "micelle" theory, 103
Coke, consumption in blast-furnace, 105, 359; consumption-reduction methods in iron smelting, 359; crack study by fluorescence, 482; dense, effect on blast-furnace performance, 229; determination of sulphur in, 382; dry cooling, 103, 482; dry cooling, heat transfer, 482; dry cooling, working-group report, 103; permeability, effect on blast-furnace performance, 229; poor-quality, cupola-operation technique, 232; quality, effect on blast-furnace operation, 105; quality, effect in cupola, 362; radio-active sulphur experiments, 482; research in France, 509
Coke Dust, briquetting for use in cupola, 482
Coke-Oven Gas, in German steel industry, 357; in new slab reheating furnace, 107; separation of hydrogen, 103
Coke-Oven Industry, technological education, 103
Coke-Oven Refractories, Dinas, hot repair, 483; Dinas with magnesite binder, 483; effect of reduced supplies, 103
Coke Ovens, effect of reduced refractories supplies, 103; factors affecting service life, 103; intermittent, coking heats, 482; radio-active sulphur experiments, 482; refractories, Dinas, testing, 228; Still type, 481
Coking, anthracite/coal blends, 482; heats for Ruhr coals, 482
Coking Properties of Virginian Coals, 481
Cold Brittleness, testing, 503
Cold Extrusion, steel, 235, 367
Cold Forming, 235
Cold Pressing, steel shells, 366
Cold-Rolled Sheet, production, 368; production at Gary Works, 368
Cold-Rolled Strip, production, 368
Cold Rolling, compression test, 236; mill designs, 368; steel strip, 237; thin steel sheets, 492
Cold-Treatment, steel, 366
Colouring of Metals, 112
Compensated Charging for Blast-Furnace, 105
Compressed Air, in open-hearth furnace, 106; in patenting steel wire, 236
Compression Test in Relation to Cold Rolling, 236
Concentration, mineral, 356; ore, spiral equipment, 356
Continuous Casting, theory, 233
Contour Roll Turning, 236
Control Instruments, Russian, 237
Converters, basic, blowing study, 486; basic, refractory practice at Corby, 484; monolithic refractories, 484; refractory materials, 358; refractory trends, 485; relining and patching, 484; side-blown, refractory studies on model, 484
Conveyors, for heavy coils, 237
Cooling Water, treatment, 383
Copper, determination by colorimetry, 251; grain-lattice measurement, 123; pickling by sodium hydride, 111; X-ray interpretation of hyperfine structure, 246
Copper–Chromium Cast Iron, graphitization, 244
Copper–Nickel–Phosphorus System, X-ray study of phosphorus section, 506
Copper Powders, compressibility tests, 113
Copper–Tin Alloy, in electroplating, 112
Copper–Vanadium System, 157
Cordierite, in blast-furnace linings, 229
Core Blowing, American method, 233
Core-Bonding Agents, 232; new materials in steel foundry, 231; organic, thermal decomposition, 232; research abroad, 232; thermosetting resins, 233
Core Dipping and Spinning, practice at Ford Motor Co., 107
Core-Hardening Properties of SAE Alloy Steels, 377
Core Heating, dielectric-loss, 233; infra-red, 233
Core Loss, hysteresis evaluation, 375; testing, 374, 375
Core Ovens, 233
Core-Room, mechanization, 107
Cores, bonding, 232; cement-sand, 107; gases evolved, 232; hardened permeable, 490; testing wear resistance, 107
Corrigenda, abstracts, 483; corrosion test in relation to cold rolling, 96
Corrosion, 123, 247, 379, 506; accelerated testing, 123; acid-resisting alloy, electron-diffraction study, 124; atmospheric, of ferrous metals, 124; bearing, by oils, test, 237; in boilers, 248; boiler-plant, 381; in boiler tubes, 248; cathodic protection, 249, 380, 507; chromium steel in chemical plant, 380; effect of phosphate solutions, 379; electrolytic, of underground pipes, 125, 259; galvanized iron fittings for telegraph poles, 249; gaseous, determination by adsorption balance, 507; high-temperature, 124; influence on thermal deposition of calcium carbonate, 248; iron, crystal formation, 124; iron, prevention, 248; iron, protective-coating processes, 497; low-carbon steel, effect of humidity, 249; metallic protective coatings, 495; mild steel by sulphuric acid, 380; oil-distillation plant, 125; oil-refinery plant, 249; prevention, 379; prevention in condenser tubes, 249; prevention in iron and steel in water and soils, 248; prevention in water-tanks, 248; protection against, 112; protection of gas and water

Corrosion—*continued.*
pipelines, 111; protective coating processes, 497; relationship with adsorption, 381; research in U.S. Navy, 125; sea-water, sodium nitrite as inhibitor, 125, 380; sea-water, of steel piling, 507; by sodium hypochlorites, 248; steel fittings for telegraph poles, 249; steel piling in sea-water, 507; steels in industrial atmosphere, 380; steels under stress, 248; in sulphur dioxide, effects of temperature and humidity, 249; surface, in coal washeries, 249; surface problems, 379; testing equipment, 249; of turbine journals, 125; of welded joints, measurement, 124; welded stainless steels, 380; zinc, effect of humidity, 249
Corrosion Control, 124
Corrosion Cracking, steels in nitrate solutions, 248
Corrosion-Erosion of Boiler Feed Pumps, 125
Corrosion Fatigue on Wire, test results, 242
Corrosion-Inhibited Fuels, 507
Corrosion Inhibitors, 247, 379; adsorption on steel, 124; sodium nitrite, 125, 380; sodium nitrite, effect of oxygen, 507; sodium silicates, 248; stearic acid, adsorption on steel, 124
Corrosion Products on Acid-Resisting Alloy, electron-diffraction study, 124
Corrosion Resistance, in sea water, polarization tests, 248; sprayed metal coatings, 497; under adjustable bending stress, 124
Corrosion-Resistant Coatings, 495, 497; rare-metal, 495
Corrosion-Resistant Materials, for pickling- and plating-tank linings, 111
Corrosion Technology, pulse polarizer, 380
Corrosion Tests, accuracy with hermetic apparatus, 124; activating stainless steel specimens, 507; causes of scatter, 507; heater-tube materials in acid concentrations, 124; at Kure Beach, 124, 507; specimen-heating method, 507
Corrosive Liquids, stainless-steel tank linings, 380
Costing Systems, standardization, 383
Cottonseed Oil, determination on tinplate, 497
Cottrell Gas-Cleaning Process, 482
Crack Detection, "black light" method, 372; magnetic-fluid method, 373; magnetic-powder technique, 243
Cracks, fine, influence on stainless steel, 121; intercrystalline, in boiler steel, 248; grinding, 239; hardening, 241; in impact tests, 241; propagation, 114; shelling, on rails, 372
Cranes, electric overhead in steelworks, specifications, 369; magnetic torque control, 369; overhead, for heavy coils, 237; overhead, in steelworks, travel-motion performance (*Paper*), 439; overhead travelling, designs, 369
Crankcases, locomotive, fabrication by welding, 238
Crankshafts, carburizing heat-treatment, 491; cast, fatigue strength, 115; cast-iron, production, 364; damping, 118
Creep, 119; cold-drawn ingot iron, influence of strain rate, 504; effect of production practice, 243; recovery in steel, 120; relaxation tests, 120, 376
Creep Behaviour, 376
Creep Resistance, influence of load, 376
Creep-Rupture Strength, effect of production practice, 243
Creep Testing, 119; damage curves, 243; facilities at National Tube Co., 376; recovery, 120
Creep-Testing Machine, 243
Croloy Steel, 486
Crucible Steel Co., rolling-mill plant, 236, 492
Crystal Inclusions, 247
Crystal Lattice, constants measurement, 505; deformation near surface, 246; scattering of short elastic waves, 246
Crystalline Structure, Weissenberg diagrams with Torrojo camera, 505
Crystals, cubic, orientation, 123; plastic deformation, 114; single, chemical activity, 249
Cupola, air-blast measurement, 362; briquetting coke dust for, 482; British and American design and operation, 488; carbon absorption in model, 362; effect of blast humidity, 362; effect of coke quality, 362; heat calculations, 362; linings, French developments, 484; liquid-metal level, indication by radio-isotope gauge, 362; melting steel scrap, 106; model, design and operation, 362; model, at McWane Cast Iron Pipe Co., 362; operation with poor coke, 232; refractory materials, 358, 484; refractory trends, 485; relining and patching, 484; theory and practice, 106; water-cooled, 488
Curie Point, displacement on extension, 243
Cutting, electric, under water, 493; formation of continuous chip, 110
Cutting Temperatures, determination, 110
Cutting Tools, in compression, 111
Cutting and Welding, oxy-acetylene, 511 (*Book*)
Cwmfelin Steelworks, description of plant, 105
Cyanide Heat-Treatment, layout, 234
Cyanide Plating Wastes, disposal, 495
Cyanogen, determination in producer gas, 252
Cyclotron Electromagnet, soft iron for, 242
Cylinder-Block Production, 365
Czechoslovakia, briquetting lignite by Dolni Rychmov method, 481

Damascened Swords, fabrication in Merovingian and Carolingian periods, 509
Damping, dislocations as cause, 375; by torsional vibrations in crankshafts, 118
Davy and United Engineering Co., Ltd., rod mill, 367
Decarbonization, by oxygen in electric furnace, 487; of steel, mechanism, 234
Decarburizat on of Spring Steels, 265 (*Paper*)
Deep Drawing, 491
Deformation, additive, 371; characteristics, 502; effect on martensitic transformation, 506; lamellar similarity, 502; plastic, 502; in plastic bending, 500; plastic, of crystals, 114; plastic, effect of phosphate coatings, 367; plastic, production of fibrous structures, 109; plastic, time delay with rapid stress, 371; recovery, 372; steel during heat-treatment, 490; steel under static loads, 243; study by photo-grid process, 109
Deformation Parameters, influence in isotropic metals, 374
Deformation Theories of Plasticity, 114
Deformation and Flow, 127 (*Book*)
Deformed Metal Aggregates, residual lattice strains, 372
Degassing, electrolytic, of hard chromium plating, 240
Denain-Anzin Co., variable-turbulence blast-furnace-stove trials, 485
Deoxidation, carbon–molybdenum steel, 487; inclusion control, 488; white cast iron, 363; white cast iron, effect on graphitization, 363
Deoxidizers, 487, 488; effects on sulphide inclusions, 246
Derbyshire, early attempt at trade-unionism by ironworkers, 405 (*Paper*)
Descaling, Bullard-Dunn process, 496; electrolytic, 239, 496; Vacu-Blast process, 239; wire, 494
Deshaw Rust-Removal Process, 240
Desulphurization, iron–manganese system, 360; in open-hearth, effect of bauxite, 486; sodium carbonate, use of basic-lined ladles, 360
Detroit Edison Co., corrosion-erosion tests, 125
Diabase, effect on magnesite refractories, 483
Dialkyl Selenides, as oxidation inhibitors for lubricating oils, 109
Dictionary of Chemistry, 255 (*Book*)
Dielectric Heating, 365
Dies, pressing, calculations, 366; sintered carbide, construction, 367; tungsten carbide, 491; wire-drawing, polishing, 367
Diesel-Engine Crankcases, fabrication by welding, 238
Diffusion, in metals and alloys, 376
Diffusion Annealing, effect on structural steel, 500
Diffusion of Carbon and the Carburization Process, 257 (*Paper*)
Dilatometer, optical, determination of isothermal transformation diagram, 165
Dinas Refractories. *See* Refractory Materials
Direct Processes, ironmaking, 105
Dislocation Theory of Slip, 502
Dislocations, as cause of damping, 375; internal, photoelastic study with silver chloride, 115
Disposal of Spent Acid Pickling Liquor, 85
Dithizone, use in colorimetric determination of copper, 251
Dolni Rychmov Lignite-Briquetting, 481
Dorman, W. H., and Co., Ltd., new foundry, 488
Dow-Corning Corporation, silicone products, 369
Drawing, 108, 235, 366, 491; continuous-rod, 367; effect of phosphate coatings, 367; high-alloy steels, 367; hot, HSS drill rod, 235; stainless steel, 236; tube, stresses, 367
Drawing Equipment, 235
Drawing Lubricants, 369
Drill Rod, HSS, hot-drawing, 235
Drives for Ore-Dressing Plant, 368
Drop-Forging Dies, production, 366
Drop Forgings, steel, 366
Drop Hammers, 366
Drying, infra-red, for enamels, 240
Drying Oils, natural, review, 232
Ducol W Steel, transition temperature, 502; welded, zone transition temperatures, 371
Ductile Metals, fracture, 114
Ductility, measurement in sheet metals, 371
Duplexing, at Hüttenwerk Huckingen A.G., 231
Dupont de Nemours, sodium hydride pickling, 111
Dust Control, in foundry, 365
Dust and Fume Standards for Metallurgica Plants, 510
D.W. Steel, transition temperature, 502; welded, zone transition temperatures, 371
Dynamic Torsion in Aircraft Metals and Alloys, 121
Dynamometers, hydraulic, 500

Economics, 253, 382
Education, metallurgical, 253; metallurgical, in Australia, 253; technological, in coke-oven industry, 103
Elco-Udylite Nickel-Plating Solutions, 496
Effluents, determination of *p*H, 509
EI 319 Steel, effects of nitrogen, 120
Elastic Constants, dynamic measurement, 371
Elasticity and Plasticity, 502
Electric-Arc Furnace, ferrosilicon, material and heat balances, 231; Pechiney-Cartoux, 234
Electric Furnaces, acid, 486; acid, use of oxygen, 487; annealing malleable-iron castings, 489; basic, use of oxygen, 487; cast-iron foundry application, 232; 512 (*Book*); decarburization in, 234; decarburization by

Electric Furnaces—*continued.*
oxygen in, 487; electrical hazards, 486; graphite resistor, melting practice, 106; for hardening bearing balls, 491; induction, basic steel-tight refractories, 357; induction coreless, development, 231; for iron smelting, 360; laboratory, automatic temperature regulation, 104; low-shaft, comparison with blast-furnace, 359; production of chromium–molybdenum–nickel steel, 488; production of stainless steel, 488; production of "synthetic" cast iron, 359; safety equipment, 486; three-phase, for iron-ore reduction, 359; wear of chrome-magnesite arches, 483
Electric-Furnace/Bessemer Process, at Hüttenwerk Huckingen A.G., 231
Electric-Furnace Slags, effect on heat-treatment of malleable iron, 533
Electric Generation and Distribution in Iron and Steel Works, 327 (*Paper*)
Electric Pig-Iron Smelting Plant at Mo i Rana, planning, 170
Electric Steel, production in Great Britain, 167
Electric Welding, electronic control, 357; time studies and output control, 369; under water, 493
Electrical Hazards in Melting Shop, 486
Electrical Power Plant, magnetic materials, 242
Electrical Systems in Steelworks, protective devices, 237
Electrochemical Studies of Protective Coatings, 141 (*Paper*), 499
Electrodeposited Coatings, effect of substrate surfaces, 239; hardness testing, 239; microstructure, 239; structure, 495; thickness determinations, 239
Electrodeposition of Cadmium–Zinc Coatings, 497
Electrodeposition of Molybdenum Alloys, 497
Electrodeposition Plant, at Fescol, Ltd., 240
Electrodes, hot, for local heating and heat-treatment, 110; welding. *See* Welding Electrodes
Electrogalvanizing, zincate electrolytes, 496
Electrographic Analysis of High-Temperature Alloys, 381
Electrolytes, fused silica, 231
Electrolytic Corrosion, protection of buried pipelines, 249
Electrolytic Degassing, hard chromium plating, 240
Electrolytic Descaling, 239, 496
Electrolytic Iron, 485
Electrolytic Pickling, Bullard-Dunn process, 239, 496; installations at Carnegie-Illinois Steel Corporation, 494
Electrolytic Polishing, 494; electrolyte for steels, 111; explosion hazards with aceto-perchloric baths, 494; metallographic specimens, 122; plated coatings, 111
Electrolytic Sharpening of Tools, 111
Electrolytic Tinplate, coating-weight determination, 495; economics, 497
Electromagnetic Flaw Detection, apparatus, 118
Electrometer, 507
Electron-Diffraction Study of Corrosion Products, 124
Electron-Diffraction Study of Surfaces, polishing devices, 246
Electron Microscope, application to study of steels, 122; grain-boundary studies, 122; metallurgical applications, 245; metallurgical-research applications in Germany, 245; metallurgical techniques, 378; plastic replication of specimens, 122; plastic and silica-film replicas, 122; replica technique for fracture-surface examination, 246; study of complex alloys, 246; study of iron–carbon alloys, 246; study of iron crystals, 124; study of quenched and tempered steel, 122, 288; study of tungsten powders, 246
Electronic Measurement and Control of Heat, 357
Electronics, in iron and steel industry, 368
Electroplating, alternating-current process, 239; cleaning and plating, 111; with copper–tin alloy, 112; plant design, 495
Electroplating Solutions, determination of zinc impurities, 496
Electroplating Wastes, treatment, 112
Elementary Metallurgy and Metallography, 255 (*Book*)
Elliott Pilot Oxygen Plant, 509
Elsworth Ltd., heat-treatment plant, 234
E.M.E. Alloy, properties, 121
Emission-Spectra Analysis, in Russia, 251
Enamelling, porcelain, furnace-temperature measurement, 357; preparation of sheet-metal pressings, 111; preparation of special steels, 111
Enamelling Defects, carbon as source, 499; on sheets, 499
Enamels, chemical resistance, 499; drying, infra-red tunnel, 240; high-temperature, for sheet steel, 240; improving with lithium, 240; on low-carbon steel, 498; porcelain, drying, 240; production of mottled finishes, 499; spot test, 499; sprayed, 499; sprayed decorative designs, 499; titania, effects of electrolytes, 498; titania, lithium compounds, 240; titanium, applications, 498; titanium, development and properties, 498; vitreous, adhesion to mild steel, 498
Enamel Cover Coat to Steel, 240
Endurance Limit, statistical nature, 115
Engineering Materials, chemical constitution and properties, 125 (*Book*); identification, 383
Engineering Steels, heat-treatment, 510 (*Book*)
English Iron Trade with Iceland in Fifteenth Century, 509
English Knife in Early Middle Ages, 160 (*Paper*), 509
Epstein Strips, permeability testing, 374
Ernst Hardness Tester, 374
Erosion-Corrosion, 249
Etching Reagent, nitric-acid/acetic-acid, 122
Ethylene, polymerized, spraying, 112
Extensometer, recording, for rolling mills, 109
Extrusion, cold, of steel, 235; hot, applications, 109; hot, methods, 235

Face Milling, influence of steel hardness, 110
Fatigue Life, effect of stress amplitude fluctuations, 373
Fatigue Properties, effect of metallizing, 373
Fatigue Strength, of cast crankshafts, 115; determination with Schenck machines, 373; effect of hard chromium plating, 373; effect of yield point, 242; welded joints, 369
Fatigue-Testing Machine, 115; Schenck, 373; three-roller type, 373
Fatigue Tests, chromium-plating, 373; cost reduction, 373; factors influencing data, 115; formulæ for solid and hollow shafts, 115; manganese steel, 372; on rail webs, 116; rolling-load, on rail-joint bars, 116; on spot-welded steel sheets, 493; on welded and riveted trusses, 116
Fatty Acids, surface attack, 369
FE-ISOL Coating Process, 240
Ferric Chloride, in determination of iron in sponge iron, 252
Ferric Oxide, determination in iron ore, 381; influence of gas adsorption on reaction with nickel oxide, 124
Ferrites, mixed, magnetic properties, 117
Ferro-Alloys, production, 231
Ferrochromium, determination of chromium in, 249; non-metallic inclusions, 123
Ferromagnetism, principal work since about 1938, 117
Ferromanganese, determination of silicon and chromium by spectroscopy, 382; replacement by electrolytic manganese, 107
Ferromolybdenum, determination of molybdenum in, 250; 252
Ferronichrome, heat resistance, 244
Ferrosilicon, determination of silicon and chromium by spectroscopy, 382; high-percentage, 231; spectrographic analysis, 382
Ferrosilicon Furnace, arc, material and heat balances, 231; hearth processes, 231
Ferrotungsten, determination of tungsten by specific gravity, 382
Ferrous Oxide, determination in acid slags by spectrography, 381; determination in iron ore, 381; determination in sinter, 381
Ferrous Phosphide, miscibility with chromium, manganese, and nickel phosphates, 506
Fescol, Ltd., electrodeposition plant, 240
Fibrous Structures, production during plastic deformation, 109
File Steel, treatment, use of town's gas, 235
Films, adsorbed, phase changes, 376; surface, sorption, 498
Fin Formation, prevention in rolling bars, 109
Finishing, action of stones on metal, 239; automobile bodies, 240; Metallichrome coating, 240; organic, 113; plastic replicas, 494; preparation of surfaces, 111; surface, checking, 239
Flame, gas, research, 103
Flame Cleaning, in preparing steel for painting, 111
Flame-Cutting, 110, 237, 369, 492; Buckle torch, 238
Flame-Hardening, gear-wheel teeth, 366; oxy-acetylene, 366
Flame Radiation in Bessemer Converter, 230
Flash Welding, wide strip steel, 369
Flask Surface Hardening, grey cast iron, 364
Flaws, ultrasonic detector, 243
Flotation, coal slurries, 356
Flow, fuel-gas, metering, 103; liquid-fuel, metering, 103; of liquid metals, 231
Flow and Deformation, 127 (*Book*)
Flow Mechanism for Solid Metals, 114
Flowmeter, ring-balance, 103
Flowrator Meter, 494
Flue Dust, nodulizing, 355; rotary sintering in Luxembourg, 356
Flue Gas, gate-valve control, 356; instruments for analysis, 382
Fluorescent Testing, cracks in coke, 482; detection of surface defects, 115
Flywheels, iron, moulding and casting, 233
Fontana Works, blast-furnace practice, 360
Ford Motor Co., core dipping and spinning at Rouge works, 107
Forging, 108, 235, 366, 491; equipment at Pittsburgh Forgings Co., 491; of hammer anvils, 235; impact action, 235; precision, gas-turbine blades, 366
Forging Dies, cast-steel, 366
Forging Furnaces, fuel consumption, 234
mechanized, 234
Forging Manipulators (*Paper*), 463
Forgings, trimming tools, 366
Forming, cold, 235
Formvar Replicas, dry stripping from etched surfaces, 246
Forsterite. *See* Refractory Materials
Foundry, application of statistics, 365; colloidal clays, 490; at W. H. Dorman and Co., Ltd., 488; dust control, 365; grey-iron, at International Harvester Co., 488; malleable-iron, grinding operations, 489; mechanized, at Textile Machine Works, 365; mechanization, 365; quality control, 106; refractory-materials developments, 484; steel. *See* Steel Foundry; tempera-

Foundry—*continued.*
ture measurement of liquid metals, 357; use of gas, 488
Foundry Pig Iron, production from steel scrap, 106
Foundry Practice, 106, 232, 362, 488; cement-sand process, 107; cupola operation with poor coke, 232; cylinder-block production, 365; electric furnace, 232; heat transfer, 365; planning, 233; progress, 233; roll-founding at R. B. Tennent, Ltd., 233; for steel-castings production, 489
Foundry Sand. *See* Moulding Sand
Fracture, acicular, in Hadfield steel, 234; brittle, 501; brittle, of mild-steel plating, 241; 238, 482; brittle, in welds, in chromium steels, 241; cleavage, in shipbuilding steels, 371; of ductile metals, 114; penetration, Shephard test, 234; semi-brittle, conditions for occurrence, 502; steel under static loads, 243
Fracture Surfaces, examination by electron microscope, 246
France, colloidal clays in synthetic moulding sands, 490; cupola-lining developments, 484; iron and steel industry, research organization, 383; sheet, strip, and tinplate industries, 368; special-steel production, 230; wire production, 236
Free-Machining Steels, ductility and impact resistance, 501
Freezing Mechanism of Horizontal Steel Castings, 91
Friction, kinetic-boundary measurement, 109, 369
Friction Sawing, 365, 493
Frost Steel and Wire Co., wire-drawing plant and operations, 235
Fuel, corrosion-inhibited, 507; liquid, flow-metering, 356; preparation, properties, and uses, 103, 356, 481
Fuel Gases, ring-balance flowmeter, 103
Fuel Oil, heavy, metering pumps for, 103
Fuel Technology, developments from 1750 to 1850, 253
Fume and Dust Standards for Metallurgical Plants, 510
Furnace-Atmosphere Control, gas equations, 234
Furnace Construction, use of lightweight refractories, 359
Furnaces, annealing, gas-fired, 491; annealing, Whiting-Cole, refractory practice, 358; basic induction, steel-tight refractory materials, 357; forging, mechanized, 234; heat transfer, 107; heat-treatment, 107, 234, 365, 490; heat-treatment, automatic control, 104; heating, 107, 234, 365, 490; high-frequency, forsterite as refractory 228; laboratory, temperature regulator, 483; mechanized, 234; metallurgical, heat transmission, 365; oil-fired, burner control, 483; salt-bath, in wire industry, 490; for steel-tube production, 234; steelmaking, 512 (*Book*); steelmaking, oxygen in, 361

Galv-Weld Process, 496
Galvanized Iron Fittings for Telegraph Poles, corrosion, 249
Galvanized Steel, spot welding, 493
Galvanizing, electrolytic-pickling lines at Carnegie-Illinois Steel Corporation, 494; hot-dip continuous, 496; hot-dip, continuous, at Weirton Steel Co., 112; hot-dip, effect of nitriding, 112; hot-dip, effect of titanium, 112; hot-dip, gas heating, 112; hot-dip, importance of nitrogen, 112; hot-dip, pickling steel window frames, 111; hot-dip, theory and practice, 240; welds, Galv-Weld process, 496
Galvanometric Regulation of Temperature, 357
Gamma–Alpha Transformation, in iron, 379; in steel, 505
Gamma Radiography, in examination of steel castings, 118
Gamma-Ray Testing, comparison with ultrasonic and X-ray methods, 119
Gang Slitters, rotary, 492
Gas, analysis, catalytic combustion apparatus, 508; analysis, chromatographic, 252; analysis, industrial methods, 252; analysis, research at Centre National de Recherches Metallurgiques, 250; blast-furnace, cleaning, 294 (*Paper*); blast-furnace, cleaning-plant performance, 305 (*Paper*); blast-furnace, calculation of particle motions, 294 (*Paper*); blast-furnace, electrostatic cleaning, 357; blast-furnace, sampling and dust analysis, 324; blast-furnace, temperature differences in relation to solids, 129 (*Paper*), 485; determination of moisture in, 252; extraction by vacuum ball mill, 251; flame research, 103; flue, gate-valve control, 356; liquified petroleum, in steel industry, 357; long-distance distribution in Germany, 482; producer, cold, 482; producer, determination of ammonia, hydrogen cyanide, and cyanogen in, 252; producer, electrostatic purification, 357; temperature measurement above 1500° C., 357; towns, in treatment of file steel, 235; use in foundries, 488
Gas Carburizing, at Borg-Warner Corporation, 490; continuous, 490; at Nash-Kelvinator Corporation, 490
Gas Cleaning, Cottrell process, 482; development of processes, 104; Venturi scrubbers, 483
Gas-Cutting Machine for Steel Plate, 238
Gas-Cyaniding, in case-hardening, 235
Gas Equations as Furnace-Atmosphere Control Check, 234
Gas-Flame Research, 103
Gas Mains, buried, cathodic protection, 380
Gas/Metal Reactions, 380
Gas Mixtures, analysis by thermal-conductivity measurements, 508
Gas Producers, component specifications, 482; coke-fired, electrostatic gas purification, 357; determination o ammonia, hydrogen cyanide, and cyanogen in gas and dust, 252; performance evaluation on slag-analysis basis, 482; research, 482; steam-jet blowers, 103
Gas-Shielded-Arc Weld Structure, comparison with oxy-acetylene weld structure, 370
Gas/Solid Heat Transfer, 482
Gas/Solid Interface, phase changes of adsorbed films, 376
Gas/Solid Temperatures, influence on blast-furnace operation, 129 (*Paper*), 485
Gas Turbines, blade deposits, 253; blades, precision forging, 366; increasing high-temperature resistance of components, 244
Gaseous Cementation, 490
Gaseous Corrosion of Metals and Alloys, determination by adsorption balance, 507
Gases, analysis, 252; by-product, in iron and steel works, 482; flue, instruments for analysis, 382; in steel, 504; transfer to metal through slag, 230
Gates, friction band sawing, 493
Gear Steel, PV hardenability test, 116
Gear Teeth, testing with pulsator, 502
Gear Wheels, hardening teeth, 366
Gears, gas carburizing, 490; highly stressed, increasing efficiency, 369; hypoid, lubricants, 110; steels for, 377; stresses, 121
General American Transportation Corporation, gas-fired annealing furnaces, 491
General Motors Corp., waste-liquor disposal at ball-bearing plant, 253
General Refractories Co., refractories research, 358, 485
Germany, coke-oven gas in steel industry, 357; electron-microscope applications in metallurgical research, 245; inorganic chemistry in, 510 (*Book*); iron and steel industry, 253; iron and steel industry during 1939–45, 486; iron and steel industry in Russian zone, 382; long-distance gas distribution, 482; patenting steel wire, 236; refractories for Bessemer foundries, 484; steelworks, 253; steelworks plant and machinery, 368; wide-strip production, 368
Glass, molten, adherence to heated metals, 509
Glazes as Protective Coatings, 358
Gotta Oxygen-Determination Process, 250
Grain Boundaries, electron-microscope studies, 122
Grain-Boundary Phenomena in Severely Heated Steel, 51 (*Paper*), 505
Grain-Growth Resistance of Spring Steels, 265 (*Paper*)
Grain Lattices, measurement, 123
Grain-Size, austenitic, determination in cast steel, 378; in cast alloy steels, 122; control and determination, 234; martensite at low temperatures, 378; metallographic determination, 378; steel, influence of aluminium, 244
Graphite, behaviour in fireclay, 228
Graphitization, cast iron, influence of zirconium, 376; controlled, in cast irons, 106; copper–chromium cast iron, 244; in malleablizing, 363; white cast iron, 363; white cast iron, effect of chromium, 376; white cast iron, effect of deoxidation, 363; white cast iron, effect of heating rate, 363
Great Britain, earliest use of cast iron in machine construction (*Paper*), 406; electric-steel production, 167; metallurgical education, 253; radio-active materials supply position, 118; sheet, strip, and tinplate industries, 368
Grey Cast Iron, surface hardening in flask, 364; treatment to produce spheroidal graphite, 489
Grey-Iron Castings, chill promoting by tellurium, 365; production in mechanized foundry, 365
Grey-Iron Foundry, at International Harvester Co., 488
Grinding, cracks and stresses, 239; in malleable-iron foundry, 489; wet, of refractory materials, 357
Grinding Balls, Meehanite, 364
Growth, high-silicon cast iron, 364
Grundhöfer Steelmaking Process, 230
Guest, Keen and Nettlefolds, rod mill, 367
Gyromagnetic Constant of Iron and Nickel, measurement, 118

Hadfield Medal, award for 1950, 475
Hadfield Steel, acicular fracture, 234
Halogen Halide Vapours, attack on metals, 125
Halsey System, comparison with Bedeaux system, 383
Hammer Anvils, forging of large, 235
Handguns, iron, early English, 280 (*Paper*)
Hardenability, effects of aluminium and boron, 116; Jominy, of spring steels, 271; PV test, 116
Hardenability of Steel, 491
Hardenability of Spring Steels, 265 (*Paper*)
Hardening, bearing balls in electric furnace, 491; flame. *See* Flame Hardening; gear-wheel teeth, 366; liquid media, cooling curves, 108; steels, from heat of rolling, 108; stresses, X-ray determination, 116
Hardening Cracks, study, 241
Hardness, alloys, relationship with phases, 374; Brinell, as function of plasticity parameters, 116; determination, 503; tool steel, effect of tempering time, 108
Hardness Testers, distortions produced by indentations, 374; Ernst portable type, 374

Hardness Testing, 116 ; chromium plating, 239 ; electrodeposited coatings, 239 ; high-temperature, 503 ; indentation method, 242 ; prolonged, 242
Hastelloy, corrosion products, 124
Haulage-Cable Wire, bend tests, 373
Hausner Chromium-Plating Process, investigation, 112
H.C.R. Magnetic Material, production and properties, 242
Heat, data for inorganic substances, 375 ; electronic measurement and control, 357
Heat-Resistant Alloys, rupture tests on sheet, 119
Heat-Resistant Cast Iron, 119
Heat-Resisting Steel, low-alloy, strength behaviour, 119 ; machining 111 ; research in U.S.S.R., 486 ; tensile and fatigue strengths at high temperatures, 120
Heat Transfer, in foundry practice, 365 ; in metallurgical furnaces, 107 ; solid/gas, 482
Heat-Treatment, 107, 234, 365, 490 ; carburizing, for crankshafts, 491 ; cyanide, layout, 234 ; effect on iron–carbon structures, 378 ; effect on magnetic properties, 117 ; effect on pressure-vessel steels, 500 ; gear steels, 377 ; induction-heating applications, 108 ; isothermal, of large steel castings, 108 ; liquid salt baths, 108 ; local, with hot electrode, 110 ; localized, 107 ; malleable iron, effect of slag types, 363 ; martempering, tool steels, 491 ; mechanized handling, 235 ; plant at Elsworth, Ltd., 234 ; problems, 235 ; processes at Cincinnati Shaper Co., 107 ; in steam atmosphere, 108 ; steel, 510 (*Book*), 365 ; steel parts, testing, 490 ; tests on chromium steel, 234 ; woodworking-machine knives, 234
Heat-Treatment Equipment, at Cincinnati Shaper Co., 107
Heat-Treatment Furnaces, automatic control, 104 ; mechanized, 234 ; modern installations, 107 ; radiant tube for, 356
Heater Tube, high-silicon iron, casting, 364
Heater-Tube Materials, corrosion in acid concentrations, 124
Heating, cyclic tests on pipe joints, 119 ; dielectric, 365 ; high-frequency, 491 ; induction, 365 ; induction, corrosion specimens, 507 ; induction, handling equipment, 108 ; induction, high-frequency metallurgical applications, 108 ; induction, for surface treatment, 234 ; radio-frequency, 365
Heating Furnaces, 107, 234, 365, 490
Heavy Forging Manipulators (*Paper*), 463
Heavy Fuel Oil, metering pumps, 103
Heintz Manufacturing Co., cold-extrusion work, 235 ; cold shaping of steel, 367
Heroult Furnace, at Whyalla, 231
Heterogeneity, in metals, spectrographic examination, 251 ; in rimmed steel, decreasing, 230
High-Alloy Steels, drawing, 367 ; strength at high temperatures, 120
High-Carbon Iron, determination of carbon in, 252
High-Frequency Heating, 491
High-Hardenability Cast Steels, effect of aluminium and vanadium, 376
High-Pressure Vessels, welding, 238
High-Silicon Cast Iron, growth and scaling, 364 ; heater tube, 364
High-Speed Steels, chromium–vanadium, suitability, 243 ; determination of tungsten by specific gravity, 382 ; knives, heat-treatment, 234 ; vanadium carbide in, 247
High-Temperature Alloys, electrographic analysis, 381
High-Temperature Hardness Testing, 503
High-Tensile Steel, butt-welded, bend tests, 371
Hilger Medium Spectrograph, in analysis of chromium–nickel steel, 125
Historical, 252, 509
Hoes, manufacture in Brazil, 109
Holland, protection of gas and water pipelines, 111 ; sheet, strip, and tinplate production, 368
Homestead Works, forging hammer anvils, 235
Horizontal Steel Castings, solidification mechanism, 91, 182 (*Paper*), 489
Hot-Die Steels, properties and treatment, 365
Hot-Dip Galvanizing, continuous, 496 ; at Weirton Steel Co., 112 ; effect of nitriding, 112 ; effect of titanium, 112 ; gas heating, 112 ; importance of nitrogen, 112 ; pickling steel window frames, 111 ; theory and practice, 240
Hot-Drawing, HSS drill rod, 235
Hot Electrode, for local heating and heat-treatment, 110
Hot-Extrusion, 109, 235
Hot-Rolled Sheet, production, 368
Hot-Rolled Strip, production, 368
Hot-Spot Machining, at high work temperatures, 110
Hot Strip, coiled, production at Newport Steel Corp., 368 ; mandrel-type coiler, 368
Hot Tinning, 496
Hounsfield Tensometer, 370
HSS Drill Rod, hot-drawing, 235
Humidity, determination in moulding sands, 232 ; effect on cupola blast, 362
Humphrey's Spiral Ore Concentrator, 356
Hungary, coal resources, 227 ; iron reduction from bauxite, 359 ; iron-ore agglomeration at Diósgyör, 481 ; moulding-sand production and properties, 107
Hüttenwerk Huckingen A.G., Bessemer/electric-furnace process, 231
Hydraulic Binders, production from blast-furnace slag, 360
Hydraulic Presses, development in United States and Great Britain, 108
Hydrocarbons, determination in air, 252
Hydrochloric Acid, solution of iron in, 248
Hydrochloric Acid Pickling, steel window frames before hot-dip galvanizing, 111
Hydrogen, in arc welding, 110 ; determination of evolution from weld-metal deposits, 508 ; determination in steel, 250 ; effect on blow-hole formation, 233 ; effect on low-temperature brittleness, 244 ; effect on mechanical properties, 244 ; effect in steel, 504 ; separation from coke-oven gas, 103
Hydrogen Brittleness, low-temperature, 244
Hydrogen Cyanide, determination in producer gas, 252
Hydrogen-Ion Concentration, determination in industrial effluents, 509 ; determination by quinhydrone meter, 509 ; determination by silver chloride electrode, 509
Hydrogen/Nitrogen Mixtures, attack on steels, 507
Hydrogen/Oxygen Equilibrium in Liquid Iron, 120
Hypoid Gears, lubricants, 110

Iceland, iron trade with England in fifteenth century, 509
I.G. Farbenindustrie, alloy-steel drawing process, 367
Illinois Coals, preparation characteristics, 356
Impact Tests, 501 ; alloy steel, 377 ; crack types, 241 ; fracture of structural steel, 114
Impact Viscosity at — 253° C., 241
Imperial Chemical Industries, Ltd., Metallichrome finish, 240
Impurities in Metals, effects, 121
Inclusions, control by deoxidizer, 488 ; crystal, 247 ; formation, effect of primary crystallization, 247 ; manganese sulphide in cast iron, 413 ; manganese sulphide in steel, 423 ;
Inclusions—*continued.*
non-metallic, in ferrochromium, 123 ; sulphide, effects of deoxidizers, 246
Indentation Tests for Hardness, 242
Induction Annealing, light stampings, 234 ; sheet metal, 491
Induction Furnaces, basic, steel-tight refractory materials, 357 ; coreless, development, 231
Induction Heating, 365 ; corrosion specimens, 507 ; handling equipment, 108 ; high-frequency, metallurgical applications, 108 ; for surface treatment, 234
Industrial Gases, analysis, 252
Industrial Uses and Applications, 509
India, tin and tungsten ore deposits, 227
Infra-Red Drying, enamels, 240
Ingot Casting, 231
Ingot-Heat Conservation, time studies, 67 (*Paper*), 488
Ingot Iron, cold-drawn, influence of strain rate on creep, 504
Ingot Moulds, 231 ; life, 231, 488 ; statistical study, 488
Ingot Yield, 234
Ingots, cooling in "water casting," 233 ; defects, effect of casting temperature and pouring speed, 362 ; rimming-steel, experiments, 362 ; teeming practice, 362
Inorganic Chemistry, 126 (*Book*) ; in Germany, 510 (*Book*)
Inorganic Substances, heat data, 375
Inspection, ultrasonic, 118
Institut de Recherches de la Sidérurgie Française, development and researches, 509 ; formation and organization, 383
Instituto del Hierro y del Acero, activities in 1949, 481
Instrument Manufacture, metals in, 509
Instrumentation, in Russia, 237
Interferometer, for analysis of argon/nitrogen mixtures, 508
Internal-Combustion Engines, alloy cast irons, 378
Internal Stresses, X-ray measurement, 486
International Harvester Co., grey-iron foundry, 488
International Nickel Co., corrosion-testing facilities at Kure Beach, 507
Introduction to Industrial Metallurgy, 253 (*Book*)
Invar Steel, behaviour in stratosphere, 120
Iraq, cathodic protection of pipelines, 507
Iron, allotropic transformations, influence of carbon, 247 ; alpha, precipitation of carbon and nitrogen, 505 ; alpha, X-ray interpretation of hyperfine structure, 246 ; attack by moist halogen vapours, 125 ; carburized water-quenched, electron-microscope study, 246 ; cast. *See* Cast Iron ; chemical pickling, 111 ; colouring, 112 ; copper–chromium cast, graphitization, 244 ; corrosion, crystal formation during, 124 ; corrosion prevention, 248 ; corrosion-protective coating processes, 497 ; crystal-lattice-constants measurement, 505 ; determination of carbon in, 252, 382 ; determination in chromite refractories, 382 ; determination in iron ores, 381 ; determination of phosphorus by spectrography, 382 ; determination in silica refractories, 252 ; determination in sponge iron, 252 ; determination of sulphur in, 250 ; determination in titanium ore, 251 ; electrolytic, 485 ; gamma–alpha transformation, 379 ; gyromagnetic constant, 118 ; hydrogen brittleness, 244 ; identification by electrography, 381 ; influence of cementite on spectrum lines, 381 ; ingot, influence of strain rate on creep, 504 ; liquid, hydrogen/oxygen equilibrium, 120 ; magnetic properties, 117 ; malleable, 108, 110, 364 ; malleable, annealing, 363 ; oxide coatings, formation and electrochemical behaviour, 506 ; pickling by sodium hydride, 111 ; protective-coating formation kinetics, 498 ; soft, for cyclotron electromagnet,

Iron—*continued.*
242; solution in hydrochloric acid, 248; sponge. *See* Sponge Iron; wrought, production and characteristics, 486
Iron Alloys, chemical pickling, 111; constitution, 123; determination of carbon in, 508; thermodynamics, 379
Iron–Aluminium–Chromium Alloys, cold-rolled strip, 245
Iron–Aluminium–Chromium–Silicon Alloys, magnetic properties, 374
Iron–Aluminium–Nickel Alloys, microscopical studies, 122; orderly precipitation, 505
Iron Anodes, effect of aqueous solutions upon reactions, 506
Iron-Base Powders, 500
Iron–Carbon Alloys, electron-microscope study, 246; influence of small amounts of certain elements on microstructure (*Paper*), 407; microstructure, 378
Iron Castings, grey, chill promoting by tellurium, 365; malleable, electric-furnace annealing, 489
Iron Cathodes, effect of aqueous solutions upon reactions, 506
Iron–Cementite System, metastable structure, 247
Iron–Chromium Alloys, magnetic investigations, 374; as substitutes for iron–nickel alloys, 374
Iron–Chromium–Nickel Alloys, electrical resistivity at high temperatures, 243; hardness, 243
Iron–Chromium–Phosphorus System, X-ray study of phosphorus section, 506
Iron–Cobalt Alloys, magnetic field and recrystallization, 378; magnetic properties, 117
Iron–Cobalt–Vanadium System, 156
Iron–Copper Compacts, preparation, 370
Iron–Copper–Phosphorus System, X-ray study of phosphorus section, 506
Iron Crystals, electron-microscope and X-ray studies, 124
Iron-Group Metals, atomic magnetic moments and interatomic distances, 243
Iron Handguns, early English, 280 (*Paper*)
Iron–Hydrogen–Vanadium System, 156
Iron–Manganese System, desulphurization, effect of acid oxides, 360; free energy and metastable states, 379
Iron–Manganese–Phosphorus System, X-ray study of phosphorus section, 506
Iron–Nickel Alloys, Curie-point displacement on extension, 243; effect of stress on electromotive force, 242; electrical resistivity at high temperatures, 243; free energy and metastable states, 379; magnetic properties, 117, 503; martensite transformation, effects of stress and deformation, 506; substitution by iron–chromium alloys, 374; X-ray study of equilibrium diagram, 379
Iron–Nickel–Phosphorus System, X-ray study of phosphorus section, 506
Iron–Nickel–Vanadium System, 157
Iron–Nitrogen–Vanadium System, 156
Iron Ore, agglomerated, influence on blast-furnace charge, 104; agglomeration at Diósgyör, 481; agglomeration by partial reduction in hydrogen, 105; beneficiation, 102, 481; concentration, 102; determination of iron and iron oxides in, 381; determination of free quartz in, 252; magnetic roasting, 102; mine at Gadsen, Alabama, 356; Northants, preparation and smelting, 102; Northants, quarrying, 355; Pervouralsk titano-magnetites, concentration, 102; research in France, 509; sintering, 102, 356
Iron-Ore Deposits, Chaillac, 227; Gorkov, 355; Kerch, 355; Labrador, 227, 355; Lahn-type, 355; Pacific Islands, 227; Roumania, 227; Russia, 227
Iron-Ore Fines, nodulizing, 355
Iron-Ore Industry, Luxembourg, 355
Iron Oxide, determination in iron ores, 381; effect on microstructure of cast iron, 412
Iron–Oxygen–Vanadium System, 156
Iron Powders, coercive field and Bragg dimensions, 243; compressibility tests, 113; magnetic properties and sintering temperature, 374; production processes, 113, 370; as standard for spectrum analysis of steel, 251
Iron–Silicon Compacts, diffusion, 113; electrical-resistivity measurements, 113
Iron–Silicon–Vanadium System, 156
Iron and Steel Industry, age distribution of personnel, 383; American, use of anthracite in coking blends, 482; electronics, 368; in France, research organization, 383; in Germany, 253; German, during 1939–45, 486; in Japan, 383; Norwegian, 253; in Russia, 253; in Russian zone of Germany, 382; Spanish, history in Guipuzcoa region, 253
Iron and Steel Metallurgy, 128 (*Book*); nuclear-physics applications, 370
Iron and Steel Research, abroad, 253
Iron and Steel Works, by-product-gas utilization, 482; centralized lubrication, 492; electric generation and distribution, 327 (*Paper*); laboratory organization and functions, 509; traffic analysis, 383; traffic, very high-frequency radio communication (*Paper*), 425
Iron Structures, exposed, protective coatings, 113
Iron–Sulphur–Vanadium System, 156
Iron Trade with Iceland in Fifteenth Century, 509
Iron–Vanadium Alloys, 153
Iron–Vanadium–Carbon System, 155
Iron Wire, magnetization in tension, 243
Ironworkers, early attempt at trade-unionism in Derbyshire (*Note*), 405
Ironworks Machinery, 237, 368
Isothermal Heat-Treatment, of large steel castings, 108
Isothermal Transformation, 165; austenite, acceleration of rate, 165; austenite in chromium magnetic steel, 123
Isothermal Transformation Diagrams, accuracy, 379; determination with optical dilatometer, 165
Isotropic Metals, deformation parameters, 374

Japan, iron and steel industry, 383; silica-brick refractories, 483
Jenolite Descaler, 494
Jet Combustion Ltd., gas-fired annealing furnaces, 491
Joint Bars, rolling-load tests, 372
Jominy End-Quench Test, 503
Jominy Hardenability of Spring Steels, 271
Jones and Laughlin Steel Co., Aliquippa works, 360

Kaiser Co., Inc., blast-furnace practice at Fontana, 360
Kaiser-Frazer Corp., finishing automobile bodies, 240
Kelcaloy, 487
Kellog Oxygen-Production Process, 253, 361, 487
Kent and Sussex, early steelworks, 278 (*Paper*)
Kettering Iron Co., cordierite in blast-furnace linings, 229
Keystone Steel and Wire Co., rod mill, 367
Knives, English, in early Middle Ages, 160 (*Paper*), 509
Krupp Steelmaking Process, 230
Krupp-Renn Plant, construction and operation at Watenstedt, 105
Kure Beach Corrosion-Testing Station, 124, 507
Kuybyshev Transformer Factory, transformer-sheet production, 366
Kyanite. *See* Refractory Materials
Kuznetsk, open-hearth furnace, 230

Laboratories, iron and steelworks, organization and functions, 509
Laboratory Furnaces, temperature regulator, 483
Laboratory and Workshop Notes, 511 (*Book*)
La Thuile Anthracite, in blast-furnace charge, 105
Labrador Iron Ore, analysis, 355; deposits, 227, 355
Lacquer Coatings, testing, 240, 499
Ladle Brick, multigrog, 357
Ladles, basic-lined, for sodium carbonate desulphurization, 360; steelworks, nozzle erosion, 358; refractory materials, 358
Lahn-Type Iron-Ore Deposits, 355
Lamellar Similarity, 502
Lattice, crystal, constants measurement, 505; crystal, deformation near metal surface, 246; crystal, scattering of short elastic waves, 246; reciprocal, X-ray camera, 504
Leaching Rate, and behaviour of anti-fouling compositions, 113
Lee Wilson Engineering Co., radiant tube, 356
Leonardo Torres Quevedo Institute of Scientific Instruments, Torrojo camera, 505
Linde-Frankl Oxygen-Production Process, 253, 369, 383
Lignite, briquetting by Dolni Rychmov method, 481
Linseed Oil, alternative, 232; as core bonder, 232; supply controls, 232
Liquid-Fuel Flow, metering, 103, 356
Liquid Iron, hydrogen/oxygen equilibrium, 120
Liquid-Metal Flow, 231
Liquid-Metal Level, indication by radio-isotope gauge, 362
Liquid Metals and Alloys, properties, 375
Liquid Nitrogen, in shrink fitting, 235
Liquid Steel, carburization, 106; decarburization mechanism, 234; determination of oxygen in, 381; radiation analysis, 357; temperature measurement, 486; temperature measurement by split thermocouples, 36 (*Paper*)
Lithium, enamelling applications, 240
Lithium Compounds, in titania enamels, 240
Locomotive Wheel Centres, casting, 364
Lorraine Iron Ores, determination of free quartz in, 252
Low-Alloy Steel, austenitic welding, 238; cast, dynamic and static properties, 501; chemical specifications, 378; corrosion cracking in nitrate solutions, 248; effect of boron, 245; heat-resisting, strength behaviour, 119; hot-working, 119; localized spectrum analysis, 381; low-temperature behaviour, 120; microscopical observations, 378; temper brittleness, 117, 378; transformation thermodynamics, 247; weldability, 238
Low-Boron Steel, annealing properties, 244
Low-Carbon Steel, effect of boron, 245; effect of humidity on corrosion, 249; effect of production practices on creep, 243
Low-Carbon Steel Strip, cold work-hardening and recovery, 501
Low-Nitrogen Steel, production in modified converter, 230
Low-Shaft Furnace, comparison with blast-furnace, 359; oxygen-enriched blast, 359; Tysland-Hole, 359
Low-Temperature Brittleness, influence of surface condition, 241; of stressed steel, 241
Lubricants, 109, 237, 369, 492; boundary, anti-seizure properties, 109; drawing, 369; effect on compressibility of metal powders, 113; for hypoid gears, 110; silicones, 369; thiophosphoric

Lubricants—*continued.*
amides as additives, 109; wire-drawing, 237
Lubricating Layers, formation, 369
Lubricating Oils, bearing-corrosion test, 237; oxidation, dialkyl selenides as inhibitors, 109; oxidation at high temperatures, 109; viscometer, 492; viscosity determinations at low temperatures, 237
Lubrication, 109, 237, 369, 492; centralized, for iron and steel plant, 492; cold-strip mill, 237
Lubrication Conditions in Plain Bearings, 109
Lukens Steel Co., nickel cladding of steel plate, 496; scrap charging in open-hearth, 486
Luxembourg, iron-ore industry, 355; rotary sintering of flue dust, 356; sheet, strip, and tinplate production, 368

Machinability, 110, 239, 493; of free-cutting steels, constant-pressure lathe test, 110
Machine Construction, earliest use of British cast iron, 406 (*Paper*)
Machine Moulding of Steel Castings, 364
Machinery for Iron and Steel Plant, 237, 368
Machining, 110, 239, 493; cutting, formation of continuous chip, 110; cutting temperatures and their determination, 110; cutting tools in compression, 111; electric-spark process, 494; heat-resistant steels, 111; hot-spot, at high work temperatures, 110; malleable iron, 110; stainless steel, 111
McQuaid-Ehn Carburizing Test, 234
McWane Cast Iron Pipe Co., cupola model, 362
Magnaflux Corp., ultrasonic testing apparatus, 118
Magnaflux Inspection Method, for oil-well equipment, 504; for pipelines, 503
Magnesia Refractories. *See* Refractory Materials
Magnesium, determination in silica refractories, 252; spectrographic determination in cast iron, 382; sprayed steel coatings, 497
Magnesium Alloys, in cathodic protection, 380
Magnesium Oxychloride Cement, 358
Magnesium Oxysulphate Cement, 358
Magnetic Field, influence on recrystallization, 378
Magnetic-Fluid Crack-Detection Method, 373
Magnetic Investigations of Iron–Chromium Alloys, 374
Magnetic Materials, 117; development, 374; for electrical power plant, 242; H.C.R., production and properties, 242; permeameter, 375; soft-iron, for cyclotron, 242; testing, 374
Magnetic Permeability of Transformer Steels, 242
Magnetic Powder Crack-Detection Technique, 243
Magnetic Properties, cast stainless steel, 503; effect of heat-treatment, 117; iron–aluminium–chromium–silicon alloys, 374; iron–chromium alloys, 374; iron compacts in relation to sintering temperature, 374; iron and iron alloys, 117; iron–nickel alloys, 117, 503; iron powder, influence of texture, 243; non-metallic materials, 117; powder alloys, 374; sheet steel, 117; stainless steel, 503
Magnetic Recording Media, at Armour Research Foundation, 375
Magnetic Strain Gauge, 502
Magnetic Stress Analysis, 375
Magnetic Study of Transformations in Austenitic Alloys, 506
Magnetic Testing, methods, 118; steel, 375
Magnetite, agglomerated, influence on blast-furnace charge, 104
Magnetization, effect of tension, 374; iron wire by tension, 243
Magnitogorsk, open-hearth furnaces, 230
Malleable Iron, annealing pots, 364; blackheart, effect of temperature and silicon on annealing, 363; controlled-atmosphere annealing, 363; effect of slag types, 363; machining, 110; pearlitic, production, 108
Malleable-Iron Castings, electric-furnace annealing, 489
Malleable-Iron Foundry, grinding operations, 489
Malleablizing, graphitization, 363
Mallory (P.R.) and Co., resistance-welding laboratory, 110
Manganese, conservation in open-hearth, 231; determination in steel, 250, 251; determination with steeloscope, 125; economy in Bessemer practice, 360; effect on extension of Ar_1 range in mild steel, 401; effect on microstructure of iron–carbon alloys, 412; effects in cast iron, 378; electrolytic, in acid electric foundry practice, 107
Manganese–Nickel–Phosphorus System, X-ray study of phosphorus section, 506
Manganese–Vanadium System, 158
Manganese Ore, beneficiation, 227; concentration, 356
Manganese-Ore Deposits, Ariz, 227; Arizona, 481; Brazil, 481; California, 227; Roumania, 227
Manganese Oxide, determination in acid slags by spectrography, 381
Manganese Phosphate Coatings, 498
Manganese Steel, fatigue tests, 372
Manganese Sulphide Inclusions, cast iron, 413; steel, 423
Marine Boilers, deterioration, 380
Marine Engineering, metallizing applications, 113
Marshall Richards Machine Co., Ltd., Pathfinder back-pull wire-drawing machine, 236
Martempering, crankshafts, 491; tool steels, 491
Martensite, grain-size at low temperatures, 378, 506; tempered, X-ray study, 123; X-ray line breadths, 506
Martensitic Transformation, 505, 506; effects of stress and deformation, 506
Martensitic Quench and Tempering, 506
Materialprüfungsamt, non-destructive test methods, 114; static extensometer, 115
Materials Handling, in open-hearth operation, 230; in wire industry, 369
Mechanical Properties, spring steels after hardening and tempering, 271
Mechanization, of heat-treatment operations, 235
Meehanite Grinding Balls, 364
Melting Shop, electrical hazards, 486; structural frames, 195 (*Paper*), 486
Mercury–Vanadium System, 157
Metal Aggregates, deformed, residual lattice strains, 372
Metal Cleaning, bibliography, 495
Metal Flow, 114, 231
Metal/Gas Reactions, 380
Metal Mixers, cements, 358
Metal Physics, 126 (*Book*), 384 (*Book*)
Metal Polishing, abrasives, 111
Metal Powders, preparation and compacting, 370
Metal Spraying, developments since 1938, 497; equipment and processes, 240; new techniques, 497; reclamation of worn parts, 497; steel on aluminium and magnesium, 497; surface preparation, 497
Metal Surfaces, oxide coatings, 506; preparation for spraying, 497
Metallic Coatings, spectrum analysis, 251
Metallic Materials, chemical behaviour in relation to surface problems, 379
Metallic Systems, binary, accuracy of solubility limits, 247
Metallichrome Coatings, 240
Metallizing, effect on steel properties, 373; equipment and processes, 240; marine-
Metallizing—*continued.*
engineering applications, 113; mining equipment, 113; processing and applications, 113; properties and advantages, 113
Metallography, 122, 245, 378, 505; electrolytic polishing of specimens, 122; electron-microscope techniques, 378; nitric-acid etching reagent, 122; phase-contrast microscope, 122; preparation of polished sections, 246; recent progress, 372
Metallography and Metallurgy, elementary, 255 (*Book*)
Metallurgical Aspects of Automobile Manufacture, 509
Metallurgical Education, 383; in Australia, 253; in Great Britain, 253
Metallurgical Furnaces, heat transmission, 365
Metallurgical Microscope, 505; phase-contrast, 122
Metallurgical Plants, dust and fume standards, 510
Metallurgical Products, evaluation by microphotography, 123
Metallurgical Research, 383; in France, 509; in Great Britain and United States, 253; high-temperature, 375; at U.S.S.R. Academy of Science, 486
Metallurgy, 253; industrial, 253 (*Book*); statistical analysis in, 509
Metallurgy of Iron and Steel, 128 (*Book*); nuclear physics, 370
Metallurgy and Metallography, elementary, 255 (*Book*)
Metals, in clock and instrument manufacture, 509; ductile, fracture, 114; effect of impurities, 121; gaseous-corrosion determination by adsorption balance, 507; heated, adherence of molten glass, 509; heterogeneity, localized, spectrographic examination, 251; in instrument and clock manufacture, 509; isotropic, deformation parameters, 374; local overstraining, 372; martensitic, transformations, 505; precious, pickling by sodium hydride, 111; seizure, 117; solid, flow mechanism, 114; surface reactions, 380
Metals and Alloys, 510 (*Book*); centrifugal testing, 376; diffusion, 376
Metals Reference Book, 255 (*Book*)
Meteorite, in Sahara, chemical and mineralogical analyses, 253
Metering, liquid-fuel flow, 103, 356
Metering Pumps for Heavy Fuel Oil, laboratory tests, 103
Metropolitan Vickers, magnetic-fluid crack detection, 373
Micro-Hardness Testing, 503
Micro-Objectives, reflecting, 378
Micro-Radiography, 123
Microlattice, in study of microplasticity, 242
Michiana Products Corp., welding stainless cups, 370
Microphotographs, in evaluation of metallurgical products, 123
Microscope, Compound, use in ultra-violet light, 245
Microscope, Electron, application to study of steels, 122; grain-boundary studies, 122; metallurgical applications, 245; metallurgical-research applications in Germany, 245; metallurgical techniques, 378; plastic replication of specimens, 122; plastic and silica-film replicas, 122; replica technique for fracture-surface examination, 246; study of complex alloys, 246; study of iron–carbon alloys, 246; study of iron crystals, 124; study of quenched and tempered steel, 122, 288; study of tungsten powders, 246
Microscope, Inverted, for microhardness testing, 374
Microscope, Metallurgical, 505; phase-contrast, 122
Microscope, Phase-Contrast, metallurgical, 122

Microscopic Precipitation Studies, carbon and nitrogen in alpha iron, 505 ; iron–aluminium–nickel alloys, 505
Microscopy, detection of overheating and burning of steel, 46 (*Paper*), 505
Microstructure, iron–carbon alloys and cast irons, influence of small amounts of certain elements (*Paper*), 407
Midwest Piping and Supply Co., steel-tube production furnaces, 234
Mild Steel, adhesion of vitreous enamel, 498 ; ageing, relation to Portevin/Le-Chatelier phenomenon, 116 ; brittleness, 163 ; corrosion by sulphuric acid, 380 ; effect of phosphate solutions, 379 ; extension of Ar_1 range with carbide formation due to high temperature (*Paper*), 399 ; welded, transition temperatures, 371 ; welding, 369
Mild-Steel Plating, notched-bar tests, 241
Mild-Steel Sheets and Coils, design and operation of annealing plant, 87
Milling, face, influence of steel hardness, 110
Milling Cutters, cast, 239 ; properties and wear, 239
Milling-Machine Quills, chromium plating, 112
Mineral Concentration, 356
Mineral Resources, 227, 481 ; Pacific Islands, 227 ; Russia, 227
Mining Equipment, metallization, 113
Mining-Gear Failures, metallurgical examination, 115
Ministry of Food, linseed-oil controls, 232
Mixers, steelworks, cement, 358
Mo i Rana, electric-smelting plant, 170 ; steelworks, 253
Models, frustum, in blast-furnace charging tests, 180 (*Paper*) ; laboratory cupola, 362 ; side-blown converter, 484
Mohr's Circle, in determination of stresses, 115
Moisture, determination in gas, 252
Molten Glass, adherence to heated metals, 509
Molybdenum, determination in ferromolybdenum, 250, 252 ; determination by Spekker absorptiometer, 250 ; determination in stainless steels by photocolorimetry, 381 ; determination in steel, 252 ; effect in chromium steel, 120 ; effect on hot-working steels, 119 ; identification by electrography, 381
Molybdenum Alloys, electrodeposition, 497
Molybdenum Ore, Roumanian deposits, 227
Molybdenum Steel, chi phase, 506 ; deoxidizing compounds, 487
Montgomery Y Rolling Mill, 368
Mould Ovens, 233
Moulding, iron flywheels, 233 ; iron pans and vessels, 233 ; steel castings, 364
Moulding Sand, 490 ; behaviour when casting steel, 490 ; cement, preparation, 107 ; clay binders, 490 ; clay-substance determination, 232 ; control, 107 ; factors affecting choice, 107 ; for hardened permeable cores, 490 ; humidity determination by dielectrics, 232 ; Hungarian, production and properties, 107 ; olivine, uses, 171 ; properties, 107 ; reclamation, 490 ; scabbing, 232 ; synthetic, use of colloidal clays, 490
Moulds, cement-sand, 107 ; dry-sand, thermosetting-resin bonding, 233 ; ingot. *See* Ingot Moulds
Mullite. *See* Refractory Materials
Murex Laboratories, determination of molybdenum in ferromolybdenum, 252
Mysore Iron and Steel Works, Tysland-Hole furnace, 359

Nash-Kelvinator Corporation, gas carburizing, 490
National Bureau of Standards, spectrophotometry, 508
National Physical Laboratory, creep and relaxation testing, 376 ; high-temperature metallurgical research, 375
National Supply Company, heat-treatment mechanization, 235
National Tube Co., creep-testing facilities, 376
New York College of Ceramics, Allencote chrome-ore coatings, 228
Newport Steel Corp., hot-strip production, 368
Nichrome, heat resistance, 244
Nickel, attack by moist halogen vapours, 125 ; Curie-point displacement on extension, 243 ; deposited, microstructure, 239 ; determination in cobalt-base alloys, 382 ; determination in nickel-coated steel, 496 ; determination in stainless steels by photocolorimetry, 381 ; gyromagnetic constant, 118 ; identification by electrography, 381 ; pickling by sodium hydride, 111
Nickel Alloys, Curie-point displacement on extension, 243
Nickel–Chromium Steels, electric-arc welding electrodes, 110
Nickel Cladding of Steel Plate, 496
Nickel-Coated Steel, determination of nickel, 496
Nickel Oxide, influence of gas adsorption on reaction with ferric oxide, 124
Nickel Plating, alkali-metal brighteners, 496 ; microstructure of deposit, 239 ; plant at Fescol, Ltd., 240
Nickel-Plating Baths, impurities, 112 ; precipitating zinc impurities, 495 ; purification by activated charcoal, 496
Nickel-Plating Solutions, Efco-Udylite, 495
Nickel Steel, mechanical properties, 245
Nickel–Vanadium Steel, effects of metallizing, 373
Nickel–Vanadium System, 156
Nitrate Solutions, corrosion cracking of steels in, 248
Nitriding, critical review, 366 ; effect of alloying elements, 366 ; effect on hot dip galvanizing, 112 ; small steel parts, 490 ; stresses, X-ray determination, 116
Nitrogen, absorption in arc welding, 110 ; behaviour in Bessemer process, 230 ; effect on temper brittleness, 117 ; effects in EI 319 steel, 120 ; liquid, in shrink fitting, 235 ; precipitation in alpha iron, 505 ; in steel, 120
Nitrogen/Argon Mixtures, analysis by interferometer, 508
Nitrogen/Hydrogen Mixtures, attack on steels, 507
Nodular Cast Iron, British and American methods, 121 ; determination of carbon in, 252 ; development, 377 ; experiments, 489 ; progress report, 106
Nodulizing, iron-ore fines and flue dust, 355
Nodulizing Alloy, 489
Non-Destructive Testing, magnetic-powder technique, 243 ; methods at Materialprüfungsamt, 114
Non-Metallic Inclusions, in ferrochromium, 123
Northampton Sand Ironstone, quarrying, 355
Northamptonshire Ore, preparation and smelting, 102
Norway, iron and steel industry, 253
Notch Sensitivity of Ship Plate, 372
Notch Tests, effect of several notches, 115
Notched-Bar Tests, alloy steels, 377 ; annealed steels, 372 ; on steel plating, 241
Notched Specimens, Charpy, 501 ; effect of notch characteristics, 501
Notches, effect under fluctuating load, 373
Nozzles, steelwork-ladle, erosion, 358
Nuclear Physics, iron and steel applications, 370
Nucleation Phenomena in Transformations of Steels, 505
Nuts and Bolts, photoelastic stress patterns, 121

Oil, centrifugal purification, 237 ; drying, natural, review, 232 ; lubricating, bearing-corrosion test, 237 ; lubricating, oxidation, 109 ; lubricating, viscometer, 492 ; lubricating, viscosity determinations at low temperatures, 237
Oil-Distillation Plant, corrosion, 125
Oil-Film Thickness, relation to bearing-surface roughness, 109
Oil-Fired Furnaces, burner control, 483
Oil Pipelines, inspection methods, 503
Oil-Refinery Plant, corrosion, 249
Oil-Well Equipment, testing, 504
"Oiliness," experimental investigation, 369
Oliver Corporation, annealing malleable-iron castings in electric furnace, 489
Olivine. *See* Moulding Sand, *also* Refractory Materials
Open-Hearth Furnace, 512 (*Book*) ; acid, 486 ; alloy steel off heats, 360 ; automatic control, application, 106 ; basic, effect of oxygen on refractories, 358 ; carburetting with pulverized coal, 361 ; charging, 361 ; charging machine, casting, 364 ; charging practice, 106 ; decarburization in, 234 ; desulphurization, effect of bauxite, 486 ; determination of slag viscosity, 488 ; Dinas refractories for arches, 483 ; fuel rate, 106 ; life, increasing, 230 ; at Magnitogorsk and Kuznetsk plants, 230 ; manganese conservation, 231 ; metal-temperature and carbon-content distributions, 231 ; output, 106 ; output, increasing by use of oxygen, improved refractories, and slag control, 106 ; output, statistical analysis, 106 ; oxygen as combustion factor, 106 ; oxygen and compressed air in, 106 ; oxygen use, 486 ; roofs, silica cement, 228 ; scrap charging, 486 ; sulphur control, 231
Open-Hearth Auxiliaries, design and operation, 105
Open-Hearth Operation, materials handling, 230
Open-Hearth Slag, basicity determination from *p*H values, 361 ; control, 106 ; determination of viscosity, 488 ; fluidity, 231 ; formation in scrap process, 231 ; spectrum analysis, 381
Optical Dilatometer, determination of isothermal transformation diagram, 165
Optical Pyrometer, comparison with thermocouple for liquid-steel temperature measurement, 486
Ore Beneficiation, manganese ores of Wyoming, 227
Ores, agglomerated, influence on blast-furnace charge, 104 ; blending, 356 ; Chaillac deposit, 227 ; chromite, Californian deposits, 481 ; deposits in Western Pacific Islands, 227 ; iron. *See* Iron Ore ; manganese, Arizonian resources, 481 ; manganese, Brazilian deposits, 481 ; manganese, concentration, 356 ; mining and treatment, 102, 355, 481 ; Roumanian, 227 ; Siegerland fields, 355 ; spiral concentration, 356 ; titanium, determination of iron and titanium in, 251
Ore-Preparation Plant, drives, 368
Organic Coatings, 113, 125 (*Book*) ; applications, 113 ; development for special purposes, 113 ; specification, 113
Organic Solvents, in sheet-metal pressing cleaning, 111
Overhead Cranes, steelworks, travel-motion performance (*Paper*), 439
Overheating and Burning, detection by microscopy, 46 (*Paper*), 505
Overheating and Burning of Alloy Steel, influence of excessive reheating temperatures, 37 (*Paper*)
Overheating of Steel (*Paper*), 422
Oxide Coatings, electrochemical behaviour and rate of formation, 506 ; local-cell activity, 379
Oxide Films, formation, 124 ; on iron crystals, 124

Oxides, solid, reactions *in vacuo*, 120
Oxy-Acetylene Flame Hardening, 366
Oxy-Acetylene Weld Structure, comparison with arc-weld structure, 370
Oxy-Acetylene Welding and Cutting, 511 (*Book*)
Oxygen, acid electric practice, 487 ; action in arc welding, 110 ; in basic electric-steel production, 487 ; as combustion factor in open-hearth furnace, 106 ; determination by Gotta process, 250 ; determination in liquid steel, 381 ; determination in steel, 250, 381 ; distribution in basic slags, 106 ; effect on corrosion inhibition by sodium nitrite, 507 ; effect on microstructure of pure iron–carbon alloys, 410 ; effect on open-hearth refractories, 358 ; in electric furnace for decarbonization, 487 ; metallurgical applications, 230 ; in open-hearth furnace, 106, 486 ; production in Elliott pilot plant, 510 ; production by Kellog process, 253, 361, 487 ; production on large scale, 383 ; production by Linde-Frankl process, 253, 369, 383 ; in stainless-steel production, 487 ; in steelmaking furnaces, 361
Oxygen-Enriched Blast, in blast-furnaces, 359, 360
Oxygen/Hydrogen Equilibrium in Liquid Iron, 120

Pacific Islands, mineral deposits, 227
Packaging Steel Products for Export, 383
Paint Coatings, ageing/e.m.f. relationship, 240 ; lacquer, testing, 499 ; testing, 240
Paint Films, evaluation, 499
Painted Steel, resistance and capacitance measurements in sea water, 141 (*Paper*)
Painting, preparation for, flame cleaning, 111 ; spray, control system, 113 ; wet steel surfaces, 499
Paints, absorption, heating, and drying, 499 ; anti-corrosive, 113 ; cementiferous, zinc phosphate cements, 289 (*Paper*) ; phosphate, effect of humidity on setting, 291
Parco-Lubrizing Phosphating Process, 113, 478
Passivity, stainless-steel, mechanism, 248
Patenting Steel Wire, compressed-air process, 236
Pathfinder Back-Pull Wire-Drawing Machine, 236
Pattern-Making, 233 ; shop organization, 233
Pauschal Non-Magnetic States, 117
Paving Blocks, production from blast-furnace slag, 360
Pearlite, formation mechanism, 123 ; formation in steels, 505
Pearlitic Malleable Iron, production, 108
Pearlitic Structure, effect on transition temperatures, 121
Pechiney-Cartoux Electric-Arc Furnace, 234
Pennsylvania Railroad, X-ray equipment, 504
Perchloric Acid, dangers in laboratory, 252
Periodicals Examined by The Iron and Steel Institute Abstracting Service, list, 97
Permanent-Magnet Materials, minor hysteresis loops, 503
Permeability, austenitic steel, 243
Permeameter, for magnetic-material testing, 375
Perrin Steelmaking Process, 230
Personnel, age distribution in iron and steel industry, 383
Pervouralsk Titano-Magnetites, concentration, 102
Petrol Tank, burnt, metallurgical phenomena, 253
Petroleum Derivatives as Core-Bonding Agents, 232
Petroleum Gas, liquified, use in steel industry, 357
Phase-Contrast Microscope, metallurgical, 122
Phosphate, excess, determination in boiler water, 382
Phosphate Coatings, 497 ; after-treatment with chromates, 498 ; aids in drawing operations, 367 ; electrodeposited, 497 ; on iron and steel, 498 ; manganese, 498 ; recent developments, 113 ; sorption, 498
Phosphate Paints, effect of humidity on setting, 291
Phosphate Solutions, effect on corrosion, 379
Phosphatizing, Parco-Lubrizing process, 113, 478 ; theory, 498
Phosphorus, effect in chromium steels, 120 ; spectrographic determination in pig iron, 382
Phosphorus Ternary Systems, X-ray study, 506
Phosphorus–Vanadium System, 157
Photo-Grid Process, in deformation studies, 109
Photocolorimetric Analysis of Stainless Steels, 381
Photoelastic Analysis, behaviour of silver chloride, 115
Photoelastic Stress Patterns, in nuts and bolts, 121
Photoelectric Analysis, silicon in steel, 250
Physics, metal, 126 (*Book*), 384 (*Book*)
Pickling, 111, 239, 494 ; chemical, iron and iron alloys, 111 ; electrolytic, Bullard-Dunn process, 239, 496 ; electrolytic installations at Carnegie-Illinois Steel Corporation, 494 ; procedure for direct titanium-enamelling, 498 ; sodium hydride, low-temperature process, 111 ; stainless steel, 494 ; waste-water treatments, 281 (*Paper*)
Pickling Liquor, recovery, 494 ; spent acid, disposal, 85
Pickling-Room Fog, elimination by hot air, 111
Pickling Solutions, control by flowmeter, 494
Pickling-Tank Linings, corrosion-resistant materials, 111
Pig Iron, determination of carbon in, 252 ; determination of phosphorus by spectrography, 382 ; electric-smelting plant at Mo i Rana, 170 ; foundry, production from steel scrap, 106 ; high-phosphorus, steelmaking, 361 ; production, 104, 229, 359, 485 ; production in Russian zone of Germany, 382 ; world production in 1948, 382
Pinners and Wire-Drawers, of York in 1296–1762, 3 (*Paper*), 509
Pipe Joints, cyclic heating, 119
Pipelines, cathodic protection, engineering aspects, 507 ; cathodic protection in Iraq, 507 ; centrifugal lining with concrete, 112 ; electrolytic-corrosion prevention, 249 ; gas, cathodic protection, 380 ; gas and oil, coatings, 111 ; gas and water, protection in Holland, 111 ; oil, inspection methods, 503 ; underground, electrolytic corrosion, 125
Pipemaking, history, 493
Pipes, iron, centrifugal casting, 233 ; lap-welded, 493 ; welded, automatic-annealing circuits, 108
Piping of Castings, preventative compounds, 364
Piston Rings, mechanical testing, 121
Pitot-Ritter Air-Flow Measurement, in cupola, 362
Pittsburgh Forgings Co., 491
Planck, Max, autobiography, 127 (*Book*)
Planochronometric Determination of Sulphur, 250
Plastic Bending, 500 ; deformation during, 500
Plastic Deformation, atomic aspects, 502 ; of crystals, 114 ; effect of phosphate coatings, 367 ; geometry and physics, 502 ; influence of tension change, 242 ; in plastic bending, 500 ; recovery, 372 ; time delay with rapid stress, 371
Plastic Materials as Core-Bonding Agents, 232, 233
Plastic Strains, calculation in sheet metal, 367 ; effect on pressure-vessel steels, 500
Plasticity, Brinell hardness as function of parameters, 116 ; deformation theories, 114 ; determination by wedge-rolling method, 115 ; effect of surface finish, 242 ; micro, study with microlattice, 242
Plasticity and Elasticity, 502
Plates, titanium-alloyed, properties, 377
Plating, cleaning methods, 494 ; tin–zinc, recent research, 239
Plating Baths, alkaline, behaviour of tin, 497
Plating Solutions, cleaning by active carbon, 495
Plating-Tank Linings, corrosion-resistant materials, 111
Plating Wastes, cyanide, disposal, 495 ; determination of *p*H, 509 ; treatment, 112
Platinum / Platinum – Rhodium Thermocouple, comparison with optical pyrometer for liquid-steel temperature measurement, 486
Plumber's Resin, use in yield determinations, 241
Pluramelt Process, 487
Podol'sk Refractories, thermal characteristics, 357
Polarographic Analysis, mercury drop electrode, 508
Polarography, vessel, 252
Polished Specimens, preparation for electron-diffraction studies, 246
Polishing, abrasives, 111 ; electrolytic. *See* Electrolytic Polishing ; stainless steels, 111 ; surfaces for electron-diffraction studies, 246 ; wire-drawing dies, 367
Polishing Baths, aceto-perchloric, explosion hazards, 494
Polymerized Ethylene, spraying, 112, 497
Polyvinyl Acetate, as rust-preventative solution, 240
Polyvinyl Chloride, as protective coating, 113
Porcelain Enamel, drying, 240
Porcelain-Enamelling Furnace, temperature recording, 357
Porosity, determination in ceramic materials, 104
Port Kembla Works, centrifugal casting of iron pipes, 233 ; tinplate production, 236
Portevin/Le-Chatelier Phenomenon, relation to ageing, 116
Potassium, determination in silica refractories, 252
Potassium Oxides, determination in silica brick, 252
Powder Alloys, magnetic properties, 374
Powder Metallurgy, 113, 370, 500 ; advances, 370 ; design, 500 ; iron-powder production, 113 ; magnetic properties of alloys, 374 ; permanent-magnet applications, 374 ; processes, 370 ; production designing, 370 ; products, 113 ; scope and limitations of processes, 113
Powders, iron. *See* Iron Powders ; iron-base, 500 ; iron–copper compacts, 370 ; metal, in ceramics, 500 ; metal, compressibility tests, 113 ; metal, preparation and compacting, 370 ; mills for mixing, 114 ; as standards for spectrum analysis, 251 ; tungsten, electron-microscope study, 246 ; welding-electrode, determination of surface area and particle size, 110
Power Hammer, 366
Precipitates, spherical, growth from solid solution, 505
Precipitation, carbon and nitrogen in alpha iron, 505 ; in iron–aluminium–nickel alloys, 505
Precision Casting, at Watervliet Arsenal, 239
Precious Metals, pickling by sodium hydride, 111

Precision Forging, gas-turbine blades, 366
Presses, hydraulic, development in United States and Great Britain, 108
Pressing, 108, 235, 366, 491 ; cold, 491 ; light work, 366
Pressing Tools, 235 ; calculations, 366
Pressings, sheet-metal, cleaning, 111
Pressure Welding, 369
Priming Paint, for protection of structural steel, 499
Producer Gas, cold, 482 ; determination of ammonia, hydrogen cyanide, and cyanogen in, 252 ; electrostatic cleaning, 357
Producer-Gas Tars, properties, 482
Production of Ferro-Alloys, 231
Production of Pig Iron, 104, 229, 359, 485
Production of Refractories, 104
Production of Steel, 105, 230, 360, 486
Production of Wrought Iron, 486
Productivity Indices in Steel Foundries, 232
Profilometer for Wire-Drawing Dies, 63 (*Paper*), 492
Pulverized Coal, for open-hearth carburetting, 361
Pulse Polarizer, in corrosion technology, 380
Punches, pressing, calculations, 366
Punching Equipment, 235
PV Hardenability Test, 116
Pyrites, Roumanian reserves, 227
Pyrites Cinder, treatment, 105
Pyrometer, optical, comparison with thermocouple for liquid-steel temperature measurement, 486
Pyrometry, thermoelectric circuits, 483

Quality Control, in foundry, 106 ; in steelworks, 376
Quarrying, Northampton sand ironstone, 355
Quaternary Systems, graphical presentation, 379
Quenching, 506 ; critical cooling velocity, 491 ; stepped, 506
Quevedo (Leonardo Torres) Institute of Scientific Instruments, Torrojo camera, 505
Quills, milling-machine, chromium plating, 112

Radiant Tube for Heat-Treatment Furnace, 356
Radiation Thermocouples, dynamic impedance and sensitivity, 104
Radio-Active Isotopes, in determination of gas transit times in blast-furnace, 229 ; industrial uses, 118 ; in metal cleaning, 111 ; in radiography, 118 ; supply position in Great Britain, 118 ; sulphur in coke, 482 ; as tracers, 371
Radio-Activity Measurements, automatic timer, 504
Radio Communication, application to traffic control in iron and steel works (*Paper*), 425
Radio-Frequency Heating, 365
Radiography, of castings, 118 ; gamma, in examination of steel castings, 118 ; inspection standards, 119 ; radon in, 375 ; use of radio-active isotopes, 118 ; unsharpness nomogram, 118
Radiology, development abroad, 118
Radon, in engineering radiography, 375
Rail-Joint Bars, rolling-load fatigue tests, 116
Rails, causes of corrugation, 116 ; failure investigation and prevention, 372 ; failures due to transverse fissures, 115 ; fatigue tests on webs, 116 ; French and American compared, 245 ; rolling, 367 ; Russian, properties, 245 ; shelling cracks, 372 ; testing machine, 116 ; welded, tests, 372
Railway Equipment, X-ray inspection, 504
Rat-Tail Defects in Castings, causes, 489
Reciprocal Lattice, X-ray camera, 504
Recrystallization, influence of magnetic field, 378
Recuperators, grog/silicon-carbide shapes, 483
Refractory Materials, 104, 228, 357, 483 ; acid, for cupolas and converters, 484 ; basic, practice at Corby, 484 ; bend strength and bend creep determinations, 228 ; blast-furnace, testing, 358 ; calculation of resistance to thermal variations, 228 ; colloidal clays, 490 ; converters, practice in Germany, 484 ; cupola, 484 ; cupola, developments in France, 484 ; cupola and converter, 485 ; for cupolas, converters, and ladles, 358 ; determination of apparent porosity, 104 ; drying, 484 ; evaluation, 484 ; foundry, 484 ; heat-conductivity-determination apparatus, 228 ; influence on open-hearth production, 106 ; insulating power, 228 ; lightweight, use of enriched ash of Moscow coals in, 359 ; lightweight, in furnace construction, 359 ; lightweight, from Podol'sk, 357 ; magnesian cements for metal mixers, 358 ; monolithic, for converters, 484 ; open-hearth, effect of oxygen, 358 ; production, 104 ; radiation properties, 228 ; research, 358, 485 ; side-blown converter model studies, 484 ; steel-tight, for basic induction furnaces, 357 ; stratified density during pressing, 483 ; testing and research at General Refractories Co., 485 ; thermal conductivity, 228 ; wet grinding, 357 ; in Whiting-Cole annealing furnaces, 358
Refractory Materials (Aluminium Silicate), 382
Refractory Materials (Carbon), for blast-furnace hearths, 358
Refractory Materials (Chrome-Magnesite), determination of ferrous iron in, 382 ; petrography, 483 ; wear in electric furnaces, 483
Refractory Materials (Chromite), Allencote coatings, 228 ; determination of ferrous iron in, 382
Refractory Materials (Dinas), hot repair in coke ovens, 483 ; with magnesite binder for coke ovens, 483 ; production for open-hearth furnaces, 483 ; testing for coke-oven applications, 228 ; tridymite, from vein quartz, 357
Refractory Materials (Dolomite Brick), production and tests, 104
Refractory Materials (Firebrick), expansion during firing, 228 ; radiation properties, 228
Refractory Materials (Fireclay), behaviour of carbon and graphite, 228
Refractory Materials (Forsterite), 357 ; as lining for high-frequency furnaces, 228
Refractory Materials (Grog), firing in rotary kiln, 357 ; ladle brick, 357 ; shapes for recuperators, 483
Refractory Materials (Grog/Silicon-Carbide), shapes for recuperators, 483
Refractory Materials (Kaolin), 483
Refractory Materials (Kyanite), analysis, 382
Refractory Materials (Magnesia), high-temperature properties, 104
Refractory Materials (Magnesite), as binder for Dinas in coke ovens, 483 ; effect of diabase, 483 ; unfired brick, 357
Refractory Materials (Mullite), analysis, 382
Refractory Materials (Olivine), properties and uses, 171
Refractory Materials (Silica), analysis, 252 ; converter practice in Germany, 484 ; torsion tests, 104
Refractory Materials (Silica Brick), analysis, 252 ; comparative studies in Japan, 483 ; effect of scarcity on coking industry, 103 ; mechanization in production, 228 ; production from Russian quartzites, 104 ; spalling-crack characteristics, 104
Refractory Materials (Sillimanite), analysis, 382
Refractory Materials (Slag), radiation properties, 228
Reheating Furnace, for slabs, at Carnegie-Illinois Steel Corp., 107 ; for tubes, at Babcock and Wilcox Tube Co., 107
Reheating Temperatures, excessive, influence on overheating and burning of alloy steels, 37 (*Paper*)
Relaxation Tests, in terms of creep, 120
Renssalaer Polytechnic Institute, welding-arc instrumentation, 492
Research, corrosion, in U.S. Navy, 125 ; core-bonding agents, 232 ; gas-analysis at Centre National de Recherches Metallurgiques, 250 ; gas-flame, 103 ; gas producers, 482 ; iron and steel, abroad, 253 ; metallurgical, 383 ; metallurgical, in France, 509 ; metallurgical, in Great Britain and United States, 253 ; metallurgical, at high temperatures, 375 ; metallurgical, at U.S.S.R. Academy of Science, 486 ; microstructure of nickel deposits, 239 ; notched-bar, on mild-steel plating, 241 ; open-hearth charging, 361 ; organization in French iron and steel industry, 383 ; refractories, 358 ; refractories, at General Refractories Co., 485 ; strain age-hardening, 502 ; tin–zinc plating, 239 ; water-pollution, 494 ; welding, in Britain and America, 492
Residual Lattice Strains, in deformed aggregates, 372
Residual Stresses, measurement and relaxation, 115 ; in round bars, 502 ; in shot-peened steel, 502
Resin Coatings, Araldite, 497 ; polythene, 497 ; synthetic, 112
Resins, plumber's, in yield determinations, 241 ; synthetic, for protective coatings, 112 ; thermosetting, as sand- and core-bonding agents, 233
Resistance Strain Gauges, for testing oil-well equipment, 504
Resistance Welding. *See* Welding, Resistance
Rimming Steel, heterogeneity, decreasing, 230 ; production at Cwmfelin works, 105
Rimming-Steel Ingots, small, experiments, 362
Ring-Balance Flowmeter, 103
Risers, friction band sawing, 493
Riveted Trusses, fatigue tests, 116
Rod, drill, hot-drawing, 235
Rod Mill, at Guest, Keen and Nettlefolds, Ltd., 367 ; at Keystone Steel and Wire Co., 367
Rods, continuous drawing, 367
Roll Founding, at R. B. Tennent, Ltd., 233
Roll Grooves, wear determination, 236
Roll Grinder Bed, casting, 364
Roll Turning, contour, 236
Rolled Sheet, texture determination from X-ray diffraction photographs, 285 (*Paper*)
Rolled Steel, isotropy in relation to brittle failure, 501
Rolling, cold, compression test, 236 ; cold, steel strip, 237 ; cold, thin steel sheets, 492 ; hot, wide strip, 367 ; prevention of fin formation on bars, 109 ; seamless steel tubes, 368 ; shapes and rails, 367
Rolling-Load Tests, joint bars, 372 ; welded rails, 372
Rolling-Mill Drives, speed regulation by rectifier cascade, 492
Rolling-Mill Practice, 109, 236, 367, 492
Rolling Mills, cogging, 367 ; cold, modern designs, 368 ; at Crucible Steel Co., 492 ; high-speed design, 237 ; lubrication, 237 ; materials handling, 237 ; A. B. Montgomery, 368 ; power distribution, 109 ; recording extensometer, 109 ; reversing, at Crucible Steel Co., 236 ; reversing hot-strip, history and development, 109 ; rust prevention, 240 ; Sendzimir, 368 ; Steckel, 368 ; Zaprostal, 236

Rolls, design calculations, 236 ; design for beams and channels, 236 ; founding at R. B. Tennent, Ltd., 233 ; maintenance, 236
Roughness, surface, measuring device, 494
Roumania, ores, 227
Round Bars, residual stresses, 502
Rubber, chlorinated, as protective coating, 113
Rubber-Bonded Metal, applications, 108
Ruhr Coals, coking heats, 482
Rupture, steel under compression, 500
Rupture Resistance, calculation, 371
Russia, analytical-chemistry developments in 1948, 250 ; control and regulation instruments, 237 ; emission-spectra analysis, 251 ; enriched coal ash in refractories, 359 ; IM-4R tensile-testing machine, 241 ; iron-ore deposits, 227, 355 ; iron-ore deposits in Gorkov district, 355 ; iron-ore deposits at Kerch, 355 iron and steel industry, 253 ; Kerch iron-ore basin, 355 ; metallurgical research at Academy of Science, 486 ; mineral resources, 227 ; open-hearth furnaces at Magnitogorsk and Kuznetsk, 320 ; production of Dinas for open-hearth arches, 483 ; transformer-sheet production, 366 ; welding and cutting under water, 493 ; Zaprostal rolling mills, 236
Rust, removal and prevention, 239 ; variable composition of layers, 248
Rust Inhibitors, previous surface treatment, 125
Rust Prevention, 240 ; at rolling mills, 240
Rust Removal, Deshaw process, 240
Rutile, in welding-electrode coatings, 492

SAE Alloy Steels, core- and case-hardening properties, 377
SAE 1045 Steel, stress amplitude effects, 373
SAE 2340 Steel, stress amplitude effects, 373
SAE 3140 Steel, investigation of Charpy specimens, 501
SAE 4340 Steel, fatigue tests on Sonntag machine, 115 ; stress amplitude effects, 373
Safety Factors, statistical analysis, 509
Salt Baths, advantages and application in heat-treatment, 107 ; cyanide-containing, for case-hardening, 235
Salt-Bath Chromizing, Armco iron, 495
Salt-Bath Furnaces, in wire industry, 490
Scabbing of Moulding Sands, 232
Scale Formation, theories, 380
Scaling, high-silicon cast iron, 364
Schenk Fatigue-Testing Machines, 373
Schilde, Hersfeld, patenting process for steel wire, 236
Schueller Hot-Dip Galvanizing Process, 496
Sciaky Electric Welding Machines, Ltd., resistance-welding equipment, 238
Scrap, bulk handling in steelworks (*Paper*), 452 ; charging in open-hearth, 361, 486
Sea-Water Corrosion, sodium nitrite as inhibitor, 380 ; steel piling, 507
Seizure of Metals, 117
Selenium–Vanadium System, 158
Sendzimir Hot-Dip Galvanizing Process, 496
Sendzimir Rolling Mill, 368
Sewaren Generating Station, cyclic heating tests on pipe joints, 119
Shafts, testing formulæ, 115
Shearing, power requirements, 237
Sheet, alloy-steel, welding, 369 ; cold-reduced, production at Gary works, 368 ; ductility measurements, 371 ; enamelling defects, 499 ; friction band sawing, 493 ; high-temperature enamels, 240 ; hydraulic-bulge testing, 372 ; induction annealing, 491 ; magnetic properties, 117 ; plastic-strain calculations, 367 ; production, 368 ; production in western Europe, 368 ; silicon-steel, core loss and permeability, 375 ; skin-effect calculation, 243 ; stainless-steel, effect of testing speed on tensile values, 114 ; spot-welded, fatigue tests, 493 ; thin, cold rolling, 492
Sheet-Metal Pressings, cleaning before enamelling, 111
Sheet Mills, heating and cooling equipment, 368 ; mechanization, 109
Shelling Cracks in Rails, 372
Shells, steel, cold pressing, 366 ; strains in drawing from sheet, 367
Shephard Penetration-Fracture Test, 234
Ship Castings, 364
Ship Plate, notch sensitivity, 372
Shipbuilding Steels, cleavage fracture, 371 weldability, 370
Ships, stress-relief welding, 366 ; zinc plating of hulls, 113
Shot Peening, residual-stress determination, 502 ; with wire shot, 494
Shrink Fitting, with liquid nitrogen, 235
Side-Blown Converter, refractory studies on model, 484
Sidney (Sir Henry), early steelworks in Sussex and Kent, 278 (*Paper*)
Siegerland Ore Fields, 355
Silica, fused, as electrolytes, 231
Silica Cement, applications and testing, 228
Silica Refractories. *See* Refractory Materials
Silicocarnotite in Basic Slags, X-ray examination, 231
Silichromium, spectrographic analysis, 382
Silicomanganese, determination of silicon and chromium by spectroscopy, 382
Silicon, determination in stainless steels by photocolorimetry, 381 ; determination in steel by photoelectric absorptiometer, 250 ; effect on annealing of blackheart malleable, 363 ; effect on microstructure of iron–carbon alloys, 412 ; spectroscopic determination in ferro-alloys, 382
Silicon-Carbide/Grog Shapes for Recuperators, 483
Silicon Steel, magnetic properties, 117
Silicon Steel Sheet, core loss and permeability, 375
Silicon Steel Strip, cross-grain-loss testing, 374
Silicon–Vanadium System, 155
Silicones, preparation and properties, 369
Silicosis, prevention in foundries, 365
Sillimanite. *See* Refractory Materials
Silver Chloride, in photoelastic analysis, 115
Silver Chloride Electrode, for *p*H determinations, 509
Silver Plating, steel, 112
Silver–Vanadium System, 157
Single Crystals, chemical activity, 249
Sinter, addition of limestone, 105 ; determination of ferrous oxide in, 381 ; effect of properties in small blast-furnaces, 229
Sintered Alloys, 370
Sintered Carbide Dies, construction, 367
Sintered Hard Metals, strengths and applications, 114
Sintered Steel Parts, carburized, 370
Sintering, iron ore, 102, 356 ; liquid-type, 370 ; machines and processes, 102 ; rotary, of flue dust in Luxembourg, 356
Slab Reheating Furnace, at Carnegie-Illinois Steel Corp., 107
Slag Formation in Open-Hearth Scrap Process, 231
Slags, acid electric, 486 ; acid open-hearth, fluidity, 231 ; acid, spectrographic analysis, 381 ; alumina–lime–silica system, 231 ; basic, distribution of oxygen, 106 ; basic, occurrence of silicocarnotite, 231 ; blast-furnace, analysis, 252 ; blast-furnace, determination of sulphur, 508 ; blast-furnace, fluidity at low temperatures, 360 ; blast-furnace, viscosity, 229 ; determination of calcium carbide in, 381 ; determination of viscosity during melting, 488 ; electric malleable-iron furnace, 363 ; gas transfer, 230 ; open-hearth, basicity determination from *p*H values, 361 ; open-hearth, control, 106 ; open-hearth, radiation properties as refractory material, 228 ; spectrographic analysis, 381 ; synthetic, surface tension and viscosity, 361 ; treatment and use, 360 ; X-ray study of SiO_2–Al_2O_3–CaO system, 231
Slag/Steel Reactions, 361
Slag Viscosity, determination during melting, 488
Sleeve Bearings, developments, 369
Slip, dislocation theory, 502
Slitters, rotary gang, 492
Smith, Anglo-Saxon, in about A.D. 1000, 253
Snow, Deakin and Co., Ltd., Ernst hardness tester, 374
Soaking Pits, 107, 234, 365 ; modern designs, 365
Söderberg Electrode System, 167
Sodium, determination in silica refractories, 252
Sodium Carbonate, in desulphurization, basic-lined ladles, 360
Sodium Hydride Pickling, low-temperature process, 111
Sodium Nitrite, as corrosion inhibitor, 125, 380 ; effect of oxygen in corrosion inhibition by, 507
Sodium Oxides, determination in silica brick, 252
Sodium Silicates, as inhibitors of corrosion by sodium hypochlorites, 248
Solder Flow, effect of metal coatings, 238
Solid Solutions, precipitation of carbon and nitrogen, 505
Solidification, sand-cast steel shapes, 365
Solidification of Horizontal Steel Castings, mechanism, 182 (*Paper*)
Solubility Limits, accuracy in binary metallic systems, 247
Solid/Gas Heat Transfer, 482
Sonizon Ultrasonic Testing Apparatus, 118
Sönnichsen-Rohrwalzwerk, steel-tube production, 370
Sonntag Testing Machine, fatigue tests on SAE 4340 steel, 115
Sound-Vision Examination, 118
Spanish Iron and Steel Industry, history in Guipuzcoa region, 253
Spanish Iron and Steel Institute, activities, 355, 481
Sparrows Point Plant, 360
Special Steels. *See* Steels, Special
Specifications, chemical, for steels, 378
Spectrochemical Analysis of Chromium–Nickel Steel, 125
Spectrograph, Hilger medium, in analysis of chromium–nickel steel, 125
Spectrographic Analysis, of localized heterogeneity, 251 ; ferrosilicon, 382 ; magnesium in cast iron, 382 ; phosphorus in pig iron, 382 ; silicochromium, 382 ; slags, 381 ; statistical analysis, 508
Spectrography, elements in alloy phases, 381
Spectrophotometry, 508
Spectroscopic Analysis, 382
Spectrum Analysis, elements in alloy phases, 381 ; influence of cementite on iron lines, 381 ; localized, of low-alloy steel, 381 ; metallic coatings, 251 ; sparking effect, 381 ; sparking and third elements, 508 ; standards, preparation of powders, 251 ; sudden changes in lines, 251
Spectrum Control in Bessemer Process, 230
Spekker Absorptiometer, in analysis of high-speed tool steels, 250 ; determination of chromium, 250 ; determination of cobalt, 250 ; determination of tungsten, 250
Sperry Reflectoscope, 118
Spherical Precipitates, growth from solid solution, 505
Spheroidal Graphite Cast Iron, 489
Split Thermocouples, 36 (*Paper*), 483

Sponge Iron, commercial production, 105; determination of iron in, 252; steel-making, 361; Wiberg-Söderfors process, 485
Spot Testing, alloy steels, 252; bismuth, 508; enamels, 499
Spot Welding. *See* Welding, Spot
Spray Painting, control system, 113
Sprayed Coatings, *See* Coatings, Sprayed
Sprayed Enamels, 499
Spraying, metal, equipment and processes, 240; polymerized ethylene, 112
Spring Steel, comparisons, 265 (*Paper*); hardenability, grain growth, and decarburization, 265 (*Paper*); Jominy hardenability and mechanical properties, 271
Springs, steel, stress-relieving, 491
Spur Wheels, induction hardening, 234; skin-effect calculation, 243
Stainless Steel, activation for corrosion testing, 507; attack by hydrogen/nitrogen mixtures, 507; cast, magnetic properties, 503; chromium, austenitic transformation, 379; cracks, influence on mechanical properties, 121; linings for chemical tanks, 380; low-carbon 18/8, 124; machining, 111; passivity mechanism, 248; photocolorimetric analysis, 381; pickling, 494; polishing, 111; production in electric furnace, 488; replacement by clad steel, 377; sheet, effect of testing speed on tensile properties, 114; type 301, toughness, 377; use of oxygen, 487; welded, corrosion tests, 380; welding, 370; wire-drawing, 236
Stainless Steel Wire, processing, 494
Stamping, 108, 235, 366, 491; transformer sheets in Russia, 366
Stamping Equipment, 235
Stamping Shops, output and efficiency, 366
Stampings, light, induction annealing, 234
Standardization, costing systems, 383; statistical methods in industry, 383
Static Bending Strength, determination, 241
Static Properties of Cast Steels, 377
Statistical Analysis, in metallurgy, 509; of safety factors, 509; in steel industry, 509
Statistical Methods in Industry, standardization, 383
Statistics, 253, 382; foundry data, 365
Steam Generation, preheating blast-furnace gas by flue gases, 103
Steam-Generation Plant, costing, 103
Stearic Acid, adsorption on steel, 124
Steckel Wide-Strip Mill, 368
Steel, acid electric, use of electrolytic manganese, 107; additions to, effects, 245; adsorption of stearic acid, 124; aircraft, effect of chromium plating on endurance, 503; alloy. *See* Alloy Steel; annealed, notched-bar tests, 372; annealing, influence of boron, 244; armour-plate, uses, 377; attack of hydrogen/nitrogen mixtures, 507; austenite breakdown below Ms temperature, 506; austenite decomposition, 506; austenite–martensite transformation, 506; austenitic alloy, effec of elements on properties, 244 austenitic, isothermal decomposition, 505; austenitic, permeability, 243; Bainite formation, 505; Bessemer low-carbon, effect of production practice on creep, 243; bonding to aluminium, 112; boron–titanium, for moderate temperatures, 119; brittleness, low-temperature, 241; carbides, interplanar spacings, 247; carburization, 365; carburization for castings, 106; carburization as a diffusion process, 257 (*Paper*); case-hardening, 235; cast, behaviour at high temperatures, 120; casting, behaviour of moulding sand, 490; cathodic protection, 380; chemical specifications, 378; chromium. *See* Chromium Steel; chromium–molybdenum, creep resistance, 376; chromium–molybdenum,
Steel—*continued.*
effect of chromium plating, 503; chromium–molybdenum, fractures, 241; chromium–molybdenum, tensile and impact tests, 377; chromium–molybdenum–nickel, tensile and impact tests, 377; chromium–molybdenum–nickel, in electric furnace, 488; chromium–nickel, spectrochemical analysis, 125; chromium–tungsten–vanadium, carbides in, 247; chromium–vanadium, effect of chromium plating, 503; chromium–vanadium, suitability for hot and high-speed work, 243; chromium–vanadium, tensile and impact tests, 377; clad, chemical-plant applications, 377; clad, production and uses, 112; coating on aluminium and magnesium, 497; coating, FE-ISOL process, 240; coating with synthetic resins, 112; cold brittleness determination, 503; cold extrusion, 235; cold pressing, 491; cold shaping, 367; cold-treatment, 366; colouring, 112; corrosion, effect of phosphate solutions, 379; corrosion in industrial atmosphere, 380; corrosion inhibitors, 379; corrosion inhibitors, adsorption, 124; corrosion prevention, 248; corrosion-protective coating processes, 497; corrosion under stress, 248; creep testing, recovery, 120; Croloy, 486; deformation in heat-treatment, 490; deformation parameters, 374; deformation under static loads, 243; determination of alumina in, 251; determination of aluminium by spectrography, 250; determination of carbon in, 250, 382, 508; determination of chromium in, 250, 381, 382; determination of copper by colorimetry, 251; determination of hydrogen in, 250; determination of manganese in, 250, 251; determination of manganese by steeloscope, 125; determination of molybdenum in, 252; determination of oxygen in, 250, 381; determination of oxygen by Gotta process, 250; determination of silicon by photoelectric absorptiometer, 250; determination of sulphur in, 250; determination of tin by polarography, 251; determination of titanium by spectrography, 250; determination of tungsten in, 382; determination of vanadium in, 250, 381; drop forgings, 366; Ducol W, 371, 502; effect of heat-treatment, 500; effect of nitrogen, 120; effect of plastic strain, 500; effect of sulphur, 377; electric, production in Great Britain, 167; electrolytic polishing, electrolyte for, 111; electron-microscope studies, 122; enamelling, 240; engineering, heat-treatment, 510 (*Book*); fatigue strength, influence of yield point, 342; file, treatment by town's gas, 235; flame cleaning, 111; fracture under static loads, 243; free-cutting, machinability, constant-pressure lathe test, 110; free-machining, ductility and impact resistance, 501; gases in, 504; gear, 377; gearing, PV hardenability test, 116; grain-boundary phenomena, 51 (*Paper*), 505; grain-size, influence of aluminium, 244; grinding, 239; Hadfield, acicular fracture, 234; hardenability diagram, 491; hardenability, effects of aluminium and boron, 116; hardening from heat of rolling, 108; hardness, influence on face milling, 110; heat-resisting low-alloy, strength behaviour, 119; heat-resisting, machining, 111; heat-resisting research in U.S.S.R., 486; heat-resisting, tensile and fatigue strengths at high temperatures, 120; heat-treated, deformation, 490; heat-treatment, 365, 510 (*Book*); high-alloy, strength at high temperatures, 120; high-hardenability cast, effect
Steel—*continued.*
of aluminium and vanadium, 376; high-speed, chromium–vanadium, suitability, 243; high-speed, determination of tungsten by specific gravity, 382; high-speed, heat-treatment, 234; high-speed, knives, heat-treatment, 234; high-temperature behaviour, 120; history, 509; hot-die, 365; hydrogen in, 504; hydrogen brittleness, 244; inclusions, effect of preliminary crystallization, 247; Invar, behaviour in stratosphere, 120; isothermal decomposition of austenite, 505; liquid. *See* Liquid Steel; low-alloy. *See* Low-Alloy Steel; low-boron, annealing properties, 244; low-carbon, corrosion, effect of humidity, 249; low-carbon, effect of boron, 245; low-carbon, effect of production practices on creep, 243; low-nitrogen, production in modified converter, 230; low-temperature behaviour, 120; magnetic testing, 375; manganese, fatigue tests, 372; manganese sulphide inclusions, 423; martensitic transformation, 505, 506; mechanical properties, effect of hydrogen, 244; metallizing, effect on properties, 373; mild. *See* Mild Steel; nickel, mechanical properties, 245; nickel–chromium, electric-arc welding electrodes, 110; nickel-coated, determination of nickel, 496; nickel–vanadium, effects of metallization, 373; nitriding, 366; nucleation phenomena in transformations, 505; overheating (*Paper*), 422; overheating and burning, detection by microscopy, 46 (*Paper*), 505; painted, resistance and capacitance measurements in sea water, 141 (*Paper*); pearlite formation, 505; pearlite-formation mechanism, 123; pearlitic, properties, 121; phase changes at high temperatures, 378; pickling by sodium hydride, 111; pickling, treatment of waste waters, 281 (*Paper*); pipe joints, cyclic heating tests, 119; plastic deformation, influence of tension change, 242; plasticity, effect of surface finish, 242; plating, notched-bar tests, 241; protection by water-excluding coatings, 113; quenched and tempered, electron-microscope study, 122, 288; quenching, 506; quenching, critical cooling velocity, 491; rail, production in America and France, 245; research in France, 509; rimming, decreasing heterogeneity, 230; rimming, ingot experiments, 362; rimming, production at Cwmfelin works, 105; rod, drawing, 235; rolled, isotropy in relation to brittle failure, 501; rupture under compression, 500; SAE 1045, 2340, 4340, stress amplitude effects, 373; SAE 3140, investigation of Charpy specimens, 501; SAE 4340, fatigue tests on Sonntag machine, 115; St 52, bend tests, 371; severely heated, grain-boundary phenomena, 51 (*Paper*), 505; shipbuilding, cleavage fracture, 371; shipbuilding, weldability, 370; shot-peened, 502; silicon, magnetic properties, 117; silicon sheet, core loss and permeability, 375; silicon strip, cross-grain losses, 374; silver plating, 112; sintered carburized, 370; special, deformation parameters, 374; special, effect of cobalt, 245; special, preparation for enamelling, 111; special, production in France, 230; special, heat-treatment, 510 (*Book*); special, rôle of cobalt, 377; special, war-time developments, 377; spring, comparisons, 265 (*Paper*); spring, hardenability, grain growth, and decarburization, 265 (*Paper*); spring, Jominy hardenability and mechanical properties, 271; springs, stress-relieving, 506; stainless. *See* Stainless Steel; stepped quenching, 506;

Steel—*continued*
stressed, low-temperature brittleness, 241 ; strip, wide, flash welding, 369 ; structural. *See* Structural Steel ; surface finish in relation to plasticity, 242 ; surface treatment by induction heating, 234 ; teeming practice, 362 ; temper brittleness, effect of carbide distribution, 1 (*Paper*) ; titanium, direct titanium-enamelling, 498 ; titanium–boron, properties, 122 ; transformation thermodynamics, 247 ; transformations, 505, 506 ; transformations, nucleation phenomena, 505 ; transformer, magnetic permeability, 242 ; weldability, 238 ; wet, painting, 499 ; wheel centres, casting, 364 ; world production and marketing, 253 ; X-ray phase study, 378 ; yield under dynamic loading, 241 ; yield point, influence on fatigue strength, 242

Steel Casting, open-hearth charging machine, 364 ; locomotive wheel centres, 364

Steel Castings, anti-piping compounds, 364 ; examination by gamma radiography, 118 ; horizontal, solidification mechanism, 91, 182 (*Paper*), 489 ; machine moulding, 364 ; production processes, 489 ; X-ray examination apparatus, 118

Steel Fittings for Telegraph Poles, corrosion, 249

Steel Foundry, acid electric, use of electrolytic manganese, 107 ; core agents, 232 ; efficiency improvements, 489 ; machine moulding, 364 ; productivity indices, 232 ; stress analysis, 107

Steel Improvement and Forge Co., forging gas-turbine blades, 366

Steel Industry, in Australia, 230 ; German, use of coke-oven gas, 357 ; use of liquified petroleum gas, 357 ; statistical analysis, 509

Steel Parts, carburized sintered, 370 ; heat-treated, testing, 490 ; small, nitriding, 490

Steel Piling, cathodic protection in sea water, 507

Steel Plate, friction band sawing, 493 ; gas-cutting machine, 238 ; nickel cladding, 496

Steel Production, 105, 230, 360, 486 ; in 1948, 382 ; in acid electric furnace, 486 ; in acid open-hearth, 486 ; by duplexing process, 231 ; from high-phosphorus pig, 361 ; in Russian zone of Germany, 382 ; by slag-mixing processes, 230 ; increasing, 230 ; from sponge iron, 361

Steel Products, packaging, etc., for overseas shipment, 383

Steel Scrap, melting in cupola, 106

Steel Sheet, friction band sawing, 493 ; high-temperature enamels for, 240 ; magnetic properties, 117 ; silicon, core loss and permeability ; skin-effect calculation, 243 ; spot-welded, fatigue tests, 493 ; thin, cold rolling, 492

Steel Shells, cold pressing, 366

Steel/Slag Reactions, 361

Steel Springs, stress-relieving, 491

Steel Strip, cold rolling, 237 ; continuous galvanizing, 112 ; low-carbon, cold work-hardening and recovery, 501 ; low-carbon, strength-reducing annealing, 108 ; silicon, cross-grain-loss testing, 374 ; wide, flash welding, 369

Steel Structures, permissible-load calculation, 373

Steel Tubes, centrifugally cast, hot-tear prevention, 364 ; deformation during reduction, 368 ; production at Sönnichsen-Rohrwalzwerk, 370 ; production furnaces, 234

Steel Wire, patenting, 236 ; sorting with steeloscope, 125 ; surface preparation, 494 ; Young's modulus determination, 240

Steelmaking, Brandenburg process, 230 ; carbon reaction, mechanism, 106 ;

Steelmaking—*continued.*
electric-furnace/Bessemer process at Hüttenwerk Huckingen A.G., 231 ; Grundhöfer process, 230 ; with high-phosphorus pig, 361 ; ingot casting, 231 ; Krupp process, 230 ; Perrin process, 230 ; practice at Corby, 105 ; slag-mixing processes, 230 ; with sponge iron, 361 ; at Whyalla, 231

Steelmaking Furnaces, 512 (*Book*)

Steeloscope, determination of manganese in steel, 125 ; sorting thin steel wires with, 125

Steelworks, bulk handling of scrap (*Paper*), 453 ; early in Sussex and Kent, 278 (*Paper*) ; electric overhead-crane specifications, 369 ; electrical systems, protective devices, 237 ; German, 253 ; German, plant and machinery, 368 ; quality control, 376 ; " trolley phone " system, 369

Steelworks Ladles, nozzle erosion, 358

Steelworks Machinery, 237, 368

Steelworks Mixers, cement, 358

Steelworks Overhead Cranes, specification of travel-motion performance (*Paper*), 439

Stepped Quenching, 506

Stewarts and Lloyds, Ltd., basic Bessemer refractory practice at Corby, 484 ; steelmaking practice at Corby, 105

Still Coke Ovens, 481

Strain, plastic, calculations in sheet metal, 367 ; plastic, effect on pressure-vessel steels, 500 ; residual-lattice, 372

Strain Age-Hardening, research, 502

Strain-Ageing in Welding Structural Steel, 492

Strain Gauge, magnetic, 502 ; for testing oil well equipment, 504 ; wire resistance, 502

Strain Rate, influence on creep of cold-drawn ingot iron, 504

Strength of Materials, 127 (*Book*)

Stress, bending, corrosion-resistance testing under, 124 ; calculation from surface finish, hardness, etc., 116 ; complex, testing machine, 500 ; effect of electromotive force in iron–nickel alloys, 242 ; effect on martensite transformation, 506 ; fluctuating tensile, 116 ; magnetic, analysis, 375 ; rapid, time delay of deformation, 371 ; X-ray determination, 116

Stress Amplitude Fluctuations, effect on fatigue life, 373

Stress Analysis, in steel foundry, 107

Stress Diagrams, 500

Stress-Relief Welding, in ships, 366

Stress-Relieving, steel springs, 491

Stress/Strain Curves, formularization, 371

Stressed Steel, low-temperature brittleness, 241

Stresses, complex, testing machine, 500 ; determination by " Mohr's circle,' ', 115 ; dynamic, for design purposes, 241 ; in gears, 121 ; in grinding, 239 ; hardening and nitriding, X-ray determination, 116 ; internal, photoelastic study with silver chloride, 115 ; internal, X-ray measurement, 486 ; residual. *See* Residual Stresses ; tessellated, 5 (*Paper*), 502 ; in tube drawing, 367 ; yield, determination by steel-ball method, 501

Strip, hot, coiled, production at Newport Steel Corp., 368 ; hot, mandrel-type coiler, 368 ; production, 368 ; production in western Europe, 368 ; wide, production for German conditions, 368 ; widé, hot rolling, 367

Structural Frames for Melting Shops, 195 (*Paper*), 486

Structural Shapes, rolling, 367

Structural Steel, effect of diffusion annealing, 500 ; fracture in impact specimens, 114 ; priming paint, 499 ; strain-ageing in welding, 492

Submerged-Arc Welding Process, 110

Sulphide Inclusions, effects of deoxidizers, 246

Sulphur, control in blast-furnace, 105 ; control in open-hearth, 231 ; determination in anthracite, 382 ; determination in blast-furnace slags, 508 ; determination in coal, 382 ; determination in coke, 382 ; determination in iron, 250 ; determination by planochronometric method, 250 ; effect on microstructure of iron–carbon alloys, 409 ; effects in steel, 377 ; radio-active tracer study in coke, 482

Sulphur Dioxide, corrosion in, effects of temperature and humidity, 249

Sulphur–Vanadium System, 156

Sulphuric Acid, corrosion of mild steel, 380 ; neutralization treatment, 282 ; in treatment of plating wastes, 112

Superfinishing, abrasives, 239 ; action of stones on metal, 239 ; development and present position, 493 ; machines and auxiliaries, 239

Superlattice Structure, precipitation, 505

Surface Attack by Fatty Acids, 369

Surface Defects, detection by fluorescence, 115

Surface Films, sorption, 498

Surface Finish, checking, 239 ; plastic replicas, 494 ; in relation to plasticity, 242

Surface Hardening, grey cast iron in flask, 364

Surface Polishing, electron-diffraction specimens, 246

Surface Preparation, for finishing, 111 ; by flame cleaning, 111 ; for metal spraying, 497

Surface Reactions of Metals, 380

Surface Replicas, for electron-microscope studies, 246 ; Formvar, dry stripping from etched surfaces, 246 ; plastic, 494

Surface Roughness, measuring device, 494

Surface Treatment, induction heating, 234 ; Parco Lubrite process, 498

Surface Wear, testing by " Abraser," 242

Sussex and Kent, early steelworks, 278 (*Paper*)

Swansea and District Metallurgical Society, review of position, 105

Sweden, tool-steel standards, 377

Swords, damascened, fabrication in Merovingian and Carolingian periods, 509

Synthetic Cast Iron, production in electric furnace, 359

Synthetic Resins, for protective coatings, 112

Synthetic Slags, surface tension and viscosity, 361

Taber Instrument Corporation, surface-wear testing instrument, 242

Tars, producer-gas, properties, 482

Tata " A " Blast-Furnace, campaign, 104

Technological Education in Coke-Oven Industry, 103

Teeming Practice, in steel-ingot production, 361

Telegraph Poles, corrosion of steel and galvanized-iron fittings, 249

Telephones, " trolley " system in steelworks, 369

Tellurium, as chill-promoter in iron castings, 365 ; in flask surface hardening grey cast iron, 364

Temper Brittleness, carbide distribution as possible cause, 1 (*Paper*), 503 ; effects of carbon and nitrogen, 117 ; in low-alloy steels, 117, 378

Temperature Control, automatic, principles and apparatus, 104

Temperature Measurement, in continuous porcelain-enamelling furnace, 357 ; gas, above 1500° C., 357 ; liquid metals in foundries, 357 ; liquid steel, by split thermocouples, 36 (*Paper*) ; principles and apparatus, 104

Temperature Measurement and Control, 104, 357, 483

Temperature Regulation, by galvanometer, 357

Tempering, martensitic, 506
Tennent, R. B., Ltd., roll-founding practice, 233
Tensile Stress, fluctuating, 116
Tensile Testing, alloy steels, 377 ; IM-4R machine, 241 ; new machine, 114
Tensile Tests, dynamic, on steel, 241 ; effect of rate on properties of austenitic stainless sheet, 114 ; influence of specimen size, 241 ; new machine, 114
Tension, effect of change on plastic deformation, 242
Tensometer, Hounsfield, 370
Terne Lines, electrolytic-pickling, at Carnegie-Illinois Steel Corporation, 494
Tessellated Stresses, 5 (*Paper*), 502
Testing, alloy steels, 245 ; blast-furnace-brick disintegration, 358 ; centrifugal, 376 ; centrifugal velocity impact machines, 114 ; cold brittleness, 503 ; core-loss, 374, 375 ; corrosion, activation of stainless steel specimens, 507 ; corrosion, equipment, 249 ; corrosion, at Kure Beach, 124, 507 ; corrosion-resistance, by polarization method, 248 ; corrosion resistance under bending stress, 124 ; creep, 119, 120, 376 ; creep, recording, 243 ; creep recovery, 120, cross-grain losses in steel strip, 374 ; deformability of welded structures, 238 ; effect of machine weight, 241 ; effect of speed on tensile properties of austenitic stainless sheet, 114 ; fatigue, cost reduction, 373 ; fluorescent, 115 ; gear teeth with pulsator, 503 ; hardness, 116 ; hardness of chromium plating, 239 ; hardness of electrodeposits, 239 ; hardness at high temperature, 503 ; hardness, prolonged, 242 ; heat-treated steel parts, 490 ; hydraulic-bulge, 372 ; impact, 501 ; lacquer-paint coatings, 499 ; magnetic materials, 374 ; magnetic methods, 118 ; magnetic properties, 117 ; magnetic, steel, 375 ; micro-hardness, 503 ; microhardness, with inverted microscope, 374 ; moulding sand, 490 ; non-destructive. *See* Non-Destructive Testing ; notched-bar, on alloy steels, 377 ; oil-well equipment, 504 ; paint and lacquer coatings, 240 ; permeability of Epstein strips, 374 ; piston rings, 121 ; refractory materials, 228, 485 ; surface wear, "Abraser" instrument, 242 ; tensile. *See* Tensile Testing ; torsion machine, 500 ; toughness, effect of notched-specimen characteristics, 501 ; ultrasonic. *See* Ultrasonic Testing ; ultraviolet, cracks in coke, 482 ; wire, 373 ; X-ray, developments, 504 ; X-ray, ultrasonic, and gamma-ray methods compared, 119
Testing Machines, Amsler, modifications, 509 ; Avery, 371 ; for complete stresses, 500 ; torsion, 500 ; velocity impact, 114
Tests, 114, 240, 370, 500 ; bearing-corrosion, for oils, 237 ; bend, butt-welded steel, 371 ; bend, haulage-cable wire, 373 ; brittleness, choice, 242 ; carburizing, 365 ; Charpy V-notched specimens, 501 ; cold brittleness, 503 ; compression in relation to cold rolling, 236 ; corrosion, 123 ; corrosion, causes of scatter, 507 ; corrosion-erosion, 125 ; corrosion-fatigue on wire, 242 ; corrosion, specimen-heating method, 507 ; creep and relaxation at National Physical Laboratory, 376 ; creep, static curves, 243 ; fatigue, chromium-plating, 373 ; fatigue, factors influencing data, 115 ; fatigue, formulæ for solid and hollow shafts, 115 ; fatigue, on manganese steel, 372 ; fatigue, on rail webs, 116 ; fatigue, on spot-welded steel sheets, 493 ; fatigue, on welded and riveted trusses, 116 ; hardness, by indentation, 242 ; heat-treatment, 234 ; impact, 501 ; impact, on alloy steel, 377 ; impact, crack types, 241 ; impact, fracture of structural steel, 114 ; indentation, 242 ; Jominy end-quench, 503 ; McQuaid-Ehn carburizing, 234 ; notched-bar on annealed steels, 372 ; notched-bar, on steel plating, 241 ; P.V. hardenability, 116 ; rolling-load, on rail-joint bars, 116, 372 ; rolling-load, on welded rails, 372 ; relaxation in terms of creep, 120 ; rupture of sheet alloys, 119 ; Shephard penetration-fracture, 234 ; static, 377 ; tensile, dynamic, 241 ; tensile, effect of rate on properties of stainless sheet, 114 ; tensile, influence of specimen size, 241 ; new machine, 114 ; toughness on rolled steel, 501 ; welding, 238 ; welded rails, 372 ; wire workability, 373
Textile Machine Works, mechanized foundry, 365
Texture of Rolled Sheet, determination from X-ray diffraction photographs, 285 (*Paper*)
Thermocouples, platinum/platinum–rhodium, 486 ; radiation, dynamic impedance and sensitivity, 104 ; split, 36 (*Paper*), 483
Thermodynamics of Dilute Aqueous Solutions, 511 (*Book*)
Thermometer, electric-resistance, 357
Thermosetting Resins, as foundry sand and core binders, 233
Thiophosphate Amides, as lubricant additives, 109
Thomas (Richard) and Baldwins, Ltd., analytical methods, 128 ; plant at Cwmfelin works, 105
Timken Roller Bearing Co., oxygen in production of basic electric steels, 487 ; steelmaking tests with high-phosphorus pig, 361
Tin, anodic behaviour in alkaline plating baths, 497 ; determination by polarography, 251 ; determination in tungsten high-speed tool steel, 250
Tin Ore, Burmese and Indian deposits, 227
Tin Research Institute, research on tin–zinc plating, 239
Tin Undercoatings, 240
Tin–Zinc Plating, research, 239
Tinning, hot, 496
Tinplate, determination of cottonseed oil, 497 ; electrolytic, coating-weight determination, 495 ; electrolytic, economies, 497 ; production at Gary works, 368 ; production process, 496 ; production in western Europe, 368 ; X-ray thickness gauge, 368
Tinplating, alkaline, anodic behaviour, 497 ; Bullard-Dunn process, 496 ; continuous, at Port Kembla Works, 236
Titania, determination in silica brick, 252
Titania Enamels, effects of electrolytes, 498 ; lithium compounds, 240
Titanium, determination in silica refractories, 252 ; determination by spectrography, 250 ; determination in stainless steel by photocolorimetry, 381 ; determination in titanium ore, 251 ; effect in hot-dip galvanizing, 112 ; identification by electrography, 381 ; production and properties, 121
Titanium-Alloyed Plates, properties, 377
Titanium Alloys, developments, 121
Titanium-Boron Steels, properties, 122
Titanium Enamel, application, 498 ; development and properties, 498 ; direct processing on titanium steels, 498
Titanium Nitride, effect in tool steels, 377
Titanium Ore, determination of iron and titanium in, 251
Titanium Steel, direct processing of titanium enamels, 498
Tool Steel, chromium–vanadium, suitability, 243 ; effect of special nitrides, 377 ; grain-size determination and control, 234 ; hardness, effect of tempering time, 108 ; heat-treatment in steam atmosphere, 108 ; high-speed analysis by Spekker absorptiometer, 250 ; martempering heat-treatment, 491 ; for precision-forging dies, 366 ; Swedish standards, 377 ; tungsten, high-speed, determination of tin in, 250 ; ultrasonic testing, 118
Tools, electrolytic sharpening, 111 ; press, 235
Torres (Leonardo) Quevedo Institute of Scientific Instruments, Torrojo camera, 505
Torrojo X-Ray Camera, 505
Torsion Testing Machine, 500
Toughness, type 301 stainless steel, 377 testing, 501
Town's Gas, in treatment of file steel, 235
Trade-Unionism, ironworkers, early attempt in Derbyshire (*Paper*), 405
Traffic of Iron and Steel Works, anaylsis, 383 ; high-frequency radio communication, 425
Transformations in Austenitic Alloys, magnetic study, 506
Transformer Sheets, production in Russia, 366
Transformer Steels, magnetic permeability, 242
Treatment of Waste Waters from Pickling of Steel, 281 (*Paper*)
Trolley Wire, steel-aluminium, 376
Trucks, electrically operated, 383 ; for handling heavy coils, 237
Trusses, fatigue tests, 116 ; welded and riveted, fatigue tests, 116
Tube Drawing, stresses, 367
Tube Reheating Furnace, at Babcock and Wilcox Tube Co., 107
Tubes, centrifugally cast, hot-tear prevention, 364 ; deformation during reduction, 368 ; high-silicon iron, casting, 364 ; lap-welded, 493 ; steel, production at Sömmichsen-Rohrwalzwerk, 370
Tuboscope, for inspection of pipelines, 503
Tungsten, determination by Spekker absorptiometer, 250 ; determination in steel, 382 ; determination in ferrotungsten, 382 ; effects in cast iron, 245 ; identification by electrography, 381
Tungsten Carbide Tooling, 491
Tungsten High-Speed Tool Steel, determination of tin in, 250
Tungsten Ore, Burmese and Indian deposits, 227
Tungsten Powders, electron-microscope study, 246
Turbine Discs, forged steel, ultrasonic testing, 118
Turbine Journals, corrosion in sea water, 125
Tysland-Hole Furnace, 359, 360 ; at Mysore Iron and Steel Works, 359 ; suitability in Canada, 360

Ultrasonic Flaw Detector, 243
Ultrasonic Inspection, 118
Ultrasonic Testing, 375 ; aircraft parts, 118 ; applications, 118 ; comparison with X-ray and gamma-ray methods, 119 ; forged steel turbine discs, 118 ; industrial applications, 118 ; methods, 118 ; Sonizon apparatus, 118 ; by Sperry reflectoscope, 118 ; tool steels, 118
Ultrasonic Waves in Metals, reflection anomalies, 504
Ultrasonics, metallurgical applications, 118
Ultra-Violet Light, microscope for, 245
Ultra-Violet Testing, cracks in coke, 482
Underwater Welding and Cutting, 493
Unit-Load Principle at Atlantic Steel Co., 383
United States, coal-preparation plants, 356 ; coal washing, 356 ; coking with anthracite, 482 ; core-blowing, 233
U.S. Navy, corrosion research, 125
U.S. Porcelain Enamel Co., equipment and processes, 499
Universal Spring Co., stress-relieving steel springs, 491

University of Illinois, rail-crack investigation, 372
U.S.S.R. *See* Russia

Vacu-Blast Descaling Process, 239
Vacuum Ball Mill, for gas extraction, 251
Vanadium, chemical and physical properties, 149 (*Paper*); determination by Spekker absorptiometer, 250; determination in steel, 250, 381; determination in steel by photometric method, 250; effect in high-hardenability cast steels, 376; effect on hot-working steels, 119; pure, preparation, 151
Vanadium Alloys, chemical and physical properties, 149 (*Paper*), 506
Vanadium Carbide, in vanadium high-speed steels, 247
Vanadium–Carbon System, 152
Vanadium–Hydrogen System, 153
Vanadium–Nitrogen System, 152
Vanadium–Oxygen System, 151
Vanadium and Vanadium Alloys, 149 (*Paper*), 506
Vanadium–Zirconium System, 157
Venturi Gas-Cleaning Scrubber, 483
Verein Deutscher Eisenhüttenleute, activities in 1948, 383
Viscometers, for lubricating oils, 492; rotational and capillary, comparison, 237; rotational, conical type, 237
Viscosity, impact, at — 253° C., 241
Vitreous Enamel, adhesion to mild steel, 498
VLW Water-Casting Method, 233
VSG Units, in wire-drawing, 367

Waste Cyanide Plating Solutions, 495
Waste Liquors, disposal at ball-bearing plant, 253
Waste Pickle Liquor, recovery, 494
Waste Waters from Pickling of Steel, treatment, 281 (*Paper*)
Wastes, electroplating, treatment, 112
"Water Casting," 233
Water Pollution Research Board, report, 494
Watervliet Arsenal, precision casting, 239
Wear Resistance, surface, testing, 242
Weirton Steel Co., continuous hot-dip galvanizing, 112
Weissemberg Diagrams with Torrojo Camera, 505
Weld-Metal Deposits, hydrogen-evolution determination, 508
Weld Structure, autogenous, microstructure, 370
Weldability, 238; carbon and low-alloy steels, 238; shipbuilding steels, 370
Welded Blast-Furnace Shell Plates, 238, 369
Welded Joints, corrosion measurement by profilometer, 124; fatigue strength, 369
Welded Parts, X-ray examination apparatus, 118
Welded Pipes, automatic-annealing circuits, 108
Welded Rails, tests, 372
Welded Seams, study by Hounsfield tensometer, 371
Welded Stainless Steels, corrosion, 380
Welded Steels, zone transition temperatures, 371
Welded Structures, brittle fracture, 242
Welded Structures, deformability, testing, 238
Welded Trusses, fatigue tests, 116
Welding, 110, 237, 369, 492; Aircomatic process, 370; arc, absorption in, 110; arc, action of hydrogen, 110; arc, action of oxygen and nitrogen, 110; arc, alloy-steel sheets, 369; arc, instrumentation, 492; arc, submerged, 110; argon-arc, 238; austenitic, of
Welding—*continued.*
low-alloy steels, 238; blast-furnace shells, 238, 369; comparison with casting processes, 238; electric, electronic control, 357; electric, time studies and output control, 369; electric, under water, 493; in fabrication of locomotive crankcases, 238; flash, wide strip steel, 369; fusion, filler materials, 237; gas-shielded arc, 370; high-pressure vessels, 238; mild steel, 369; in pipe and tube construction, 493; pressure, 369; research in Britain and America, 492; resistance, 238; resistance, bibliography, 238; resistance, in clad-steel production, 112; resistance, testing laboratory, 110; spot, fatigue tests on steel sheets, 493; spot, galvanized steel, 493; stainless-steel cups, 370; in steel-tube production, 370; strain-ageing in structural steel, 492; stress-relief, for ships, 366; in wire industry, 493
Welding and Cutting, oxy-acetylene, 511 (*Book*)
Welding Dissimilar Metals, 493
Welding-Electrode Powders, determination of surface-area and particle-size data, 110
Welding Electrodes, for arc-welding nickel–chromium steels, 110; bare alloyed, absorption of nitrogen, 110; characteristics, 492; coatings, 492; core-wire tests, 492; operating characteristics, 492; rutile-containing, 492
Welding Metallurgy, 254 (*Book*)
Welding Rods, developments abroad, 237
Welding Technology, 254 (*Book*)
Welding Terms and Definitions, 110
Welds, brittle fracture, prevention, 238; galvanizing by Galv-Weld process, 496; porosity, 238; spot tests, 238
Wheels, spur, induction hardening, 234
White Cast Iron, for cement crushing plant, 378; deoxidation, 363; effect of chromium on graphitization, 376; effect of deoxidation on graphitization, 363; graphitization, 363; graphitization behaviour, 363; graphitization, effect of heating rate, 163
Whiting-Cole Annealing Furnaces, refractory practice, 358
Whyalla, steelmaking practice, 231
Wiberg Söderfors Furnace, 359
Wiberg-Söderfors Sponge-Iron Process, 485; applicability to Canadian conditions, 105
Wide Strip, flash welding, 369; hot rolling, 367; production for German conditions, 368
Williams Prize, award for 1949, 476
Window Frames, steel, pickling before hot-dip galvanizing, 111
Wire, corrosion-fatigue curves, 242; descaling, 494; haulage-cable, bend tests, 373; iron, magnetization in tension, 243; production in France, 236; stainless-steel, processing, 494; steel patenting by compressed air, 236; steel, sorting with steeloscope, 125; steel, surface preparation, 494; steel, Young's modulus determination, 240; testing, 373; trolley, steel–aluminium, 376; workability test, 373
Wire-Drawers and Pinners, of York in 1296–1762, 3 (*Paper*), 509
Wire Drawing, back-pull, 491; back-pull, as industrial technique, 236; back-pull, Pathfinder machine, 236; plant and operations at Frost Steel and Wire Co., 235; stainless steel, 236; VSG unit applications, 367
Wire-Drawing-Die Profilometer, 63 (*Paper*), 492
Wire-Drawing Dies, diagrammatic calculation of bores, 492; polishing, 367
Wire-Drawing Lubricants, 237
Wire-Drawing Machines, electrical controls, 367
Wire Industry, materials handling, 369; salt-bath furnaces, 490; welding, 493
Wire Mill, materials-handling, 491, 492
Wire Ropes, manufacture and applications, 509
Wire Shot for Shot Peening, 494
Work-Hardening, cold, of low-carbon steel strip, 501; plastic deformation, 114
Workshop and Laboratory Notes, 511 (*Book*)
Wrought Iron, production and characteristics, 486
Wyoming Manganese Ore, beneficiation, 227

X-Ray Absorption Spectra, interpretation of hyperfine structure, 246
X-Ray Analysis, coercive field and Bragg dimensions in iron powder, 243; of metals, 127 (*Book*)
X-Ray Apparatus, for examination of welded parts and steel castings, 118
X-Ray Camera, for reciprocal lattice, 504; for studies at various temperatures, 243; Torrojo, 505
X-Ray Determinations, coating thickness, 495; stresses, 116, 486
X-Ray Diagrams, Weissenberg, with Torrojo camera, 505
X-Ray Diffraction Photographs, in determination of texture of rolled sheet, 285 (*Paper*)
X-Ray Examination of Silicocarnotite, 231
X-Ray Exposure Conditions, nomograms, 378
X-Ray Inspection of Railroad Equipment, 504
X-Ray Line Breadths of Martensite, 378, 506
X-Ray Methods, explanation of terms, 118
X-Ray Spectroscopy, in grain-lattice measurement, 123
X-Ray Studies, alumina–lime–silica slag system, 231; iron–nickel equilibrium diagram, 379; steel phases at high temperatures, 378; ternary phosphorus systems, 506
X-Ray Testing, comparison with ultrasonic and gamma-ray methods, 119
X-Ray Thickness Gauge, for tinplate, 368
X-Ray Tube, development, 504; dismountable, for structural analysis, 504
X-Rays, in study of iron crystals, 124; in study of tempered martensite, 123

Yale and Towne Manufacturing Co., localized heat-treatment, 107
Yield, determination by plumber's resin, 241; steel under dynamic loading, 241
Yield Point, influence on fatigue strength, 242
Yield Stresses, determination by steel-ball method, 501
York, pinners and wire-drawers in 1296–1762, 3 (*Paper*), 509
Young's Modulus, precision measurement by transverse vibrations, 240

Zaprostal Rolling Mills, reconstruction, 236
Zinc, attack by moist halogen vapours, 125; corrosion, effect of humidity, 249; determination in electroplating solutions, 496; precipitation in nickel-plating baths, 495
Zinc Alloys, in cathodic protection, 380
Zincate Electrolytes, 496
Zinc Phosphate Cements for Cementiferous Paints, 289 (*Paper*)
Zinc Plating, ships' hulls, 113
Zincate Electrolytes, distribution of metal on cathode surface, 496
Zirconium, effects in cast iron, 376
Zirconium Nitride, effect in tool steels, 377
Zyglo Crack-Detection Method, 372

NAME INDEX

Abernethy, R. F. *See* Toenges, A. L.
Abramov, F. A., and **A. F. Miletich,** surface-roughness meter, 494
Abreu, A. *See* Good, J. E.
Acera, L. H., grinding cracks and stresses, 239
Adcock, F., metallurgical research at high temperatures, 375
Admiralty Central Metallurgical Laboratory, transition temperatures of welds, 371
Admiralty Corrosion Committee. Vacu-Blast descaler, 239
Admiralty Engineering Department. D.W. steels, 502
Adomovicz, M., mechanical superfinishing, 239
Afanes'ev, A. S., V. K. Rostovtseva, and **M. G. Burakova.** corrosion-testing apparatus, 124
Afanasev, B. N., and **A. V. Uralskaya,** spot test for bismuth, 508
Afonskii, I. F., critical cooling velocity of quenching, 491
Agey, W. W., and **B. K. Shibler,** concentration of California manganese ores, 227
Aguet y Duran, L., powder metallurgy, 370
Aistov, N. N., modification of old-type Amsler testers, 500
Aitchison, L., *Book*: "Introduction to Industrial Metallurgy," 253
Akolzine, P. A. *See* Patsoukov, N. G.
Albert, L., French specifications for steel–aluminium trolley wires, 376; wear of steel–aluminium trolley wires, 376
Albrecht, W. M. *See* Tilley, M.
Alexander, A. L., organic finishes, 113
Alexander, A. P., localized hardening of cast-iron parts, 364
Allen, A. H., core dipping and spinning, 107
Allen, N. P., electron microscope in metallography, 245
Allsop, W. E., polarographic determination of tin, 251
Alpatov, M. S., spectrographic determination of phosphorus, 382
Alsea, A. R. *See* White, W. H.
Ambler, C. M., oil-purification centrifuge, 237
American Iron and Steel Institute, oxygen and compressed air in open-hearth charging, 106; questionnaire on open-hearth charging, 106; statistical analysis of open-hearth heats, 105
American Welding Society, welding terms and definitions, 110
Ames, B. N., and **N. A. Kahn,** graphite-rod resistance furnace, 106
Amond, Catherine T. *See* Penrose, J. H.
Amoros, A., foundry electric furnace, 232
Amoros, J. L. *See* Torrojo, J. M.
Andersen, J. K. L., *Paper*: "Determination of an Isothermal Transformation Diagram with an Optical Thermometer." *Discussion*, 165. *Author's Reply*, 167
Anderson, A. R., bolt and nut design, 121
Andrews, K. W., χ phase in alloy steels, 506
Angus, H. T., F. Dunn, and **D. Marles,** carbon equivalent and mechanical properties of cast iron, 377
Antonioli, A., oxygen content during steel-making, 106
Archer, H. R., and **J. Howlett,** corrosion by sulphuric acid, 380
Archibald, W. A., cupola refractories, 484
Arend, A. G., ore-dressing drives, 368
Arend, H. *See* Eilender, W.
Armitage, J. B., and **A. O. Schmidt,** influence of hardness on face milling, 110
Armstrong, P. A. E., obituary notice, 479
Aronson, D. *See* Roberts, I.
Arpi, R., Swedish tool-steel standards, 377
Ascough, H. H., annealing-plant design and operation, 89
Ash, E. J., steelmaking with high-phosphorus pig, 361
Ashworth, J. A., cross-grain losses in silicon-steel strip, 374
Asnis, A. E., and **B. I. Medovar,** influence of microstructure in notch tests, 501
Ass, I. M., lamellar stresses, 502
Atcheson, M. *See* Roberts, I.
Atchison, W. B., jun., planning in foundry, 233
Aubertin, F. *See* Crussard, C.
Aubry, J., and **G. Turpin,** determination of quartz in iron ore, 252
Austin, C. R., tellurium in chill promotion, 365
Azou, P. *See* Bastien, P.

Baay, E. L., calculation of die sizes, 492
Babcock, D. E., sulphur control and manganese conservation in open-hearth, 231
Babichev, M. A. *See* Khruschov, M. M.
Bablik, H., hot-dip galvanizing, 240, 496
Bablik, H., F. Götzl, and **R. Kukaczka,** effects of silicon and titanium in hot-dip galvanizing, 112; importance of nitrogen in hot-dip galvanizing, 112
Bacon, N. H., teeming practice, 362
Bading, W., production of low-nitrogen Bessemer steel, 230
Baeyertz, M., W. F. Craig, jun., and **E. S. Bumps,** impact fractures of structural steel, 114
Baeyertz, M., W. F. Craig, jun., and **J. P. Sheehan,** effects of molybdenum and phosphorus on chromium steels, 120
Baeza, P. G., transformation of austenite, 247
Bagaryatskii, Iu. A., and **M. M. Umanskii,** X-ray camera for reciprocal-lattice studies, 504
Bagger, N. B., colouring of metals, 112; materials for cathodic protection, 249
Bagley, D., Still coke oven, 481
Bagshawe, B., and **E. Dyke,** determination of tin in tungsten steel, 250
Bailey, G. L., metallurgical research in Britain and America, 253
Baliuk, S. T., and **V. M. Mirakyan,** determination of iron in refractories, 382
Ballay, M., and **P. Mainçon,** purification of nickel-plating baths, 496
Bamford, W. H., water-cooled cupolas, 488
Baranchuk, S. I. *See* Sadovskii, V. D.
Baratta, F., and **A. Milone,** magnetization of iron wires in tension, 243
Barber, E., alloy steels, 245; case-carburizing, 365
Bardenheuer, P., and **W. A. Fischer,** structure and properties of titanium-alloyed steels, 337
Bardgett, W. E., and **L. Reeve,** mechanical properties of low-carbon low-alloy steels containing boron, 245
Bardin, J. P., metallurgical advances in the U.S.S.R., 253
Bargmore, A., and **F. Rinaldi,** decarburization of liquid steel, 234
Barich, K., German iron and steel industry, 253
Barkov, B. N., and **E. M. Rozhkov,** steeloscope determination of manganese, 125
Barnes, H., leaching rate and antifouling compositions, 113
Barnett, C. A., core and mould ovens, 233
Barr, A. E. De. *See* De Barr, A. E.
Barr, W., brittleness in mild steel, 163; biographical note, *facing* 126
Barrett, L. R., heat transfer in refractory insulators, 228
Barritt, R. J., coke-oven replacement rate, 103
Barth, V. D. *See* Campbell, I. E.
Bartleson, J. D. *See* Hughes, E. C.
Bartleson, J. D., and **M. L. Sunday,** thiophosphoric amines as lubricant additives, 109
Bassett, J. G. *See* Fitterer, G. R.
Bastien, P., fluidity of steelmaking slags, 231; formation of fibrous structures by plastic deformation, 109
Bastien, P., and **P. Azou,** reversible hydrogen brittleness, 244
Bastien, P., J. Bleton, and **E. de Kerversau,** parasitic echoes in ultrasonic testing, 504
Batelle Memorial Institute Staff. *See* Bullens, D. K.
Batty, F. A., scale braker in pickling, 86, 87
Baumer, L. N. *See* Marbaker, E. A.
Baxter, W. B., biographical note, *facing* 384
Bayer, R. O., and **E. A. Kachik,** activating stainless steel before corrosion testing, 507
Beck, F. H. *See* Fontana, M. G.
Beck, W., electrochemical factors in protection against electrolytic corrosion, 249
Beeman, D. L., power distribution in rolling mills, 109
Beezley, H. V. *See* Olson, G. R.
Begeman, H. L., M. L. Hipple, and **L. Cullum, jun.,** spot-welding galvanized steel, 493
Beilby, R. B., quarrying Northants ironstone, 355
Beiler, A. C., and **P. L. Schmidt,** core loss and permeability of silicon-steel sheet, 375
Beilhack, M., cement/sand moulds and cores, 107
Beitter, F., ingot defects, 362
Belenkii, N. D., IM-4R testing machine, 241
Belic, H. J. *See* Steinberg, R. H.
Belov, K. P., Curie-point displacement in ferromagnetic alloys, 243
Belyaev, S. E., influence of specimen size on notch sensitivity, 241
Belyankin, D. S., and **B. V. Ivanov,** petrography of chrome-magnesite, 483
Bemporad, L., coreless induction furnace, 231
Benesovsky, F. *See* Kieffer, R.
Bennett, L. W., unit-load principle in steelworks, 383
Bennett, R. S., coating-thickness determinations, 239
Bennett, R. W., foundry-sand reclamation, 490
Benninghoff, W. E., induction heating, 108
Benns, H. V., and **A. W. Tozer,** protective devices for steelworks electrical systems, 237
Berezhnoĭ, A. S., effect of diabase on magnesite, 483; sintering, 370
Berg, H., rotary nodulizing kilns, 355
Berg, J. ter. *See* ter Berg, J.
Berghezan, A. *See* Lacombe, P.
Bergmann, W. W., materials handling in open-hearth practice, 230
Berkovich, E. S., and **A. D. Kuritsyna,** drilling device for metal sampling, 250
Berkowitz, N., physics of coking, 103
Bernshtein, M. L., N. M. Onchukov, and **I. A. Yarov,** complex-stress tester, 500
Bernstoff, H., iron-powder production, 370
Bertaut, F., coercive field and crystalline dimensions, 243
Berthold, B., coating-thickness meter, 495
Bertin, M., degassing chromium plate, 240
Betz, L. D., and **J. J. Maguire,** treatment of cooling water, 383
Bewsher, J. N., construction of cast-iron equipment, 233
Beynon, R. E., beam and channel roll design, 236
Bialaczeioski, A., natural resources of the U.S.S.R., 227
Binnie, D., experiments with small rimming-steel ingots, 362
Bird, D., basic Bessemer refractories, 484
Birkin, R. G., cranes for strip coil, 237
Bischof, F., bend tests on butt welds, 371; nitrogen absorption in arc welding, 110
Bishop, E., adhesion of vitreous enamel to welded steel, 498; *see also* Hodges, L. A.
Blair, J. S., yield determination by plumber's resin, 241
Blake, P. D., particle-size determination of fine powders, 110
Blanter, M. E., critical cooling velocity of quenching, 491
Bleiweis, J. L., chromium recovery from plating wastes, 112; cleaning for plating, 494

Bleton, J. *See* Bastien, P.
Blom, A. V., *Book*: "Organic Coatings in Theory and Practice," 125
Blum, F. M., and **F. W. Wendelburg,** magnetic-torque crane control, 369
Blum, W. *See* Ogburn, F.
Blumer, A. F., oil-plant corrosion, 125
Bock, W. K., dynamic and static properties of low-alloy cast-steels, 501; statistical data in the foundry, 365
Boettcher, W., and **A. Pomp,** tube deformation in hot reduction, 368
Bogacheva, G. N. *See* Sadovskii, V. D.
Bogart, H. N. *See* Vennerholm, G.
Bogdanchenko, A. G., determination of calcium carbide in slag, 381
Bolger, J. T., eliminating pickling-room fog, 111
Bollenrath, F., and **H. Kiessler,** hardening from heat of rolling, 108
Bondarenko, P. I., large blast-furnaces, 229
Bonelle, J., elimination of iron in recovered pickling liquor, 86
Bonham, W. M., Labrador iron-ore range, 355
Bonsanno, J., powder metallurgy in toy production, 370
Boodberg, A., and **E. R. Parker,** cleavage fracture in ship plate, 371
Booley, F., costing heat and power, 103
Bordoni, C., cooling of hypo-eutectic irons, 233
Borovkov, V. V., and **P. D. Korzh,** sorting steel wire with steeloscope, 125
Borzdyka, A. M., electrical resistivity of iron–nickel alloys, 243
Borzdyka, A. M., and **G. V. Estulin,** heat resistance of ferronichrome and nichrome, 244
Botas, J. M. H. *See* de Lucas Ortueta, R.
Botham, G. H. *See* Thirsk, R. F.
Botham, G. H., and **G. A. Dummet,** inhibition of sodium hypochlorite corrosion, 248
Bottema, M. J., tensometer study of welded seams, 370
Boulanger, C., Portevin/Le-Chatelier phenomenon in mild steels, 116
Boulger, F. W. *See* Sims, C. E.
Boulger, F. W., H. L. Shaw, and **H. E. Johnson,** machinability testing by constant-pressure lathe, 110
Bowden, F. P. and **D. Tabor,** seizure of metals, 117
Bowrey, S. E., corrosion of turbine journals, 125
Boyer, H. E., heat-treating problems, 235; testing heat-treated parts, 490
Bozsin, M., and **C. A. Vana,** electronic temperature recorder, 357
Bradley, A. J., microscopical studies of iron–nickel–aluminium system, 122; orderly precipitation in iron alloys, 505
Bradley, J. H., furnace for ball-bearing hardening, 491
Braga, D. T., slag-viscosity determination during melting, 488
Braidwood, W. W., and **A. D. Busby,** spheroidal graphite cast iron, 489
Brailsford, F., magnetic materials for power plants, 242
Bramley, L. N., biographical note, 477; *see also* Wise, D. A.
Brancker, A. V., heat transfer in dry-cooling coke, 482
Brancker, A. V., J. Stringer, and **L. H. W. Savage,** *Paper*: "Ingot Heat Conservation," 67, 488
Brandenburg, S. A., contour roll turning, 236
Brandt, D. J. O., use of oxygen in metallurgical processes, 230
Brasher, D. M. *See* Wormwell, F.
Bratchikov, V. N., oil viscometers, 492
Bremer, E., castings, 233
Bremer, F. H., minimizing distortion in heat-treating, 235
Brewer, A. F., centralized lubrication, 492
Brewer, G. A., photo-grid study of deformation, 109
Brewer, R. E. *See* Davis, J. D.
Brewin, E. *See* Patchin, G.
Bridge, A., maintenance of blast-furnace and ancillary plant, 485
Brisby, M. D. *See* Mardon, H. H.
Bristow, J. R., kinetic boundary friction, 369; "oiliness" of lubricants, 109
British Iron and Steel Federation, Norwegian iron and steel industry, 253
British Iron and Steel Research Association Electric Process Sub-Committee, *Paper*: "The Manufacture of Electric Steel in Great Britain." *Discussion,* 167. *Reply,* 169
British Iron and Steel Research Association Melting and Metallurgical Committee, *Paper*: "The Mechanism of the Freezing of Horizontal Steel Castings." *Discussion,* 91
British Iron and Steel Research Association Methods of Analysis Committee, determination of chromium in ferrochromium, 249
Britton, S. C., tin undercoats, 240
Brockhaus, J. *See* Niebch, G., *also* Pomp, A.
Bron, V. A., silica brick from Russian deposits, 104; tridymite Dinas, 357
Brooke, F. W., electrical hazards in steelworks, 486
Brookshire, F. D., metals in automobile industry, 509
Brown, D. I., X-ray gauging of flat-rolled steel, 368
Brown, E. A., jun., soaking pits, 365
Brown, H. F., corrosion tests of heater-tube materials, 124
Brown, R. L., statistical methods for standardization, 383
Brown, W. E., and **L. J. Erck,** spiral concentration of Mesabi ores, 356
Bruce, B. D., high-temperature enamels for sheet steel, 240
Bruckner, W. H. *See* Wilson, W. M.
Bruckner, W. H., and **S. W. Sandberg,** strain ageing, 492
Bruin, C. A. Lobry de. *See* Lobry de Bruin, C. A.
Brun, M., and **M. Legendre,** blast-furnace-gas cleaning, 357
Brunt, F., and **H. Parnham,** basic-lined ladles for soda-ash desulphurization, 360
Brunt, N. A., plastic deformation of crystals, 114
Buchholtz, H., iron-powder production, 113
Bucknall, E. H., metals in instrument making, 509
Buffum, D. C., Charpy specimens, 501
Buffum, D. C., L. D. Jaffe, and **W. P. Clancy,** effect of carbon and nitrogen on temper brittleness, 117
Bulakhova, P. A. *See* Plotkin, N. Z.
Bullens, D. K., and **Batelle Memorial Institute Staff,** *Book*: "Steel and Its Heat-Treatment, vol. III," 510
Bumps, E. S. *See* Baeyertz, M.
Bundy, O. M., electric controls for wire-mill machinery, 367
Burakova, M. G. *See* Afanes'ev, A. S.
Burgess, C. O., nodular iron, 106
Busby, A. D. *See* Braidwood, W. W.
Busick, A. F., industrial uses of armour-plate steel, 377
Butaev, F. I., and **N. B. Jacobson,** rectifier regulation of rolling-mill drive, 492
Butler, G. B. *See* Saunders, H. L.
Byers, R. C., and **J. Dickman,** quality control in the foundry, 106

Cabarat, R., measurement of elastic constants, 371
Cable, J. W., dielectric core baking, 233
Caine, J. B., foundry sand practice, 490
Calbiani, G., ingot casting, 231
Calistru, C., electroplating with alternating current, 239
Cameron, A., surface roughness of bearings, 109
Campbell, D. F., electric steelmaking, 168
Campbell, I. E., V. D. Barth, R. F. Hoeckelman, and **B. W. Gouser,** salt-bath chromizing, 495
Campbell, J. M., obituary notice, 479
Canfield, J. J. *See* Ikenberry, L. C.
Card, H. S., resistance welding, 238
Carlsson, C. H., obituary notice, 480
Carman, P. C., *Book*: "Chemical Constitution and Properties of Engineering Materials," 125
Carney, D. J., J. Chipman, and **N. Grant,** gases in steel, 495
Carr, W. J., jun., D.C. permeameter for magnetic-material testing, 375
Carrière, J. E., and **C. A. Lobry de Bruin,** economic savings in pipeline protection methods, 111
Cartoux, H., Pechiney-Cartoux arc furnace, 234
Cartwright, W. F., annealing-plant design and operation, 89; economics of pickling-acid recovery, 87
Castro, R. *See* Gueussier, A.
Catlin, F., "black light" inspection of castings, 372
Cauchetier, J., sprayed steel coatings, 497
Cavallero, L., and **A. Indelli,** scatter in corrosion tests, 507
Cavanagh, P. E., coke conservation in iron smelting, 359; sponge-iron production, 105
Cavanagh, P. E., and **T. Wlodek,** magnetic stress analysis, 375
Cavé, M., micro-hardness of chromium plating, 239
Cerardini, C., fatigue of welded and riveted trusses, 116
Čerkesov, I., high-quality steels, 486
Chalmers, B., *Book*: "Progress in Metal Physics," 384
Chamberland, H. J., friction sawing, 365, 493
Chang, F. K., K. E. Knudsen, and **B. G. Johnston,** large torsion-testing machine, 500
Chaporova, I. N., preparation of polished sections, 246
Chapman, H. A., biographical note, 477; *see also* Mardon, H. H.
Chaudron, G., corrosion control, 124; metallurgical education and research, 383
Chavy, R. A., alloy cast irons for internal-combustion engines, 378
Cheesman, G. C. N. *See* Wyllie, D.
Chernyi, A. T., and **K. V. Podoinikova,** determination of sulphur, 250; determination of total sulphur in coal and coke, 382
Chervakov, A. N. *See* Eliseev, A. A.
Chesters, J. H., and **G. D. Elliott,** carbon linings for blast-furnaces, 358
Chesters, J. H., L. Lee, and **J. Mackenzie,** steel-tight refractory linings, 357
Chevandine, E. M., effect of surface condition on low-temperature brittleness, 241
Chidley, E. A., determination of molybdenum in ferromolybdenum, 252
Chipman, J., metallurgy, 253; *see also* Carney, D. J., Dastur, M. N.
Chistyakov, F. M. *See* Elinson, M. M.
Chizhikov, Iu. M., plasticity determinations on wedge specimens, 115
Chrenov, K. K., underwater welding, 493
Christ, J. G., P.V. hardenability test, 116
Christensen, N., welding mild steel, 369
Christiansen, H., electric-smelting plant, 359
Christiansen, H., jun., and **B. Ydstie,** *Paper*: "The Söderberg Electrode Systems." *Discussion,* 167
Chubb, W., jun., and **D. S. Eppelsheimer,** workability test for wire, 373
Chuprinko, E. S., and **D. I. Gavrish,** multi-grog ladle brick, 357
Churchill, S. C., nitriding, 366
Claitor, L. C. *See* Roberts, I.
Clancy, W. P. *See* Buffum, C. D.
Clas, G., and **K. Houben,** heat-resisting cast iron, 119
Clauser, H. R., induction annealing stampings, 234; powder metallurgy, 500
Claussen, G. E. *See* Henry, O. H.
Clegg, E. L. G., tin and wolfram in Burma and India, 227

Clews, C. J. B. *See* Trotter, J.
Clock, L. S. *See* Lipson, C.
Cohen, M., R. Pyke, and **P. Marier,** effect of oxygen on corrosion by nitrite, 507
Coheur, P., analysis of gases in steels, 250
Colin, R. H., and **D. A. Gardner,** determination of alumina, 251
Collins, J. F. *See* Offenhauer, C. M.
Colonna-Ceccaldi, J., superfinishing stones, 239
Compton, K. G., organic coatings, 113
Compton, K. G., and **A. Mendizza,** corrosion of telephone-pole fittings, 249
Comstock, G. F., boron–titanium steels, 119; corrosion of welded stainless steels, 380
Condit, P. C. *See* Denison, G. H.
Connert, W., E. Maurer, and **R. Scherer,** suitability of chromium–vanadium steels for hot and high-speed tools, 243
Conradi, Lillian, T. *See* Deas, R. E.
Conrady, H. von. *See* von Conrady, H.
Conservatoire National des Arts et Metiers, *Book*: "Semaine d'Etudes de la Physique des Metaux," 126
Conway, C. G., brittleness in mild steel, 164
Cook, L., desulphurization by bauxite in open-hearth, 486
Cooper, H. M. *See* Toenges, A. L.
Corbett, B. D., and **A. H. Honour,** automatic timer for radio-activity measurements, 504
Cornwall, D. *See* Morrison, K. G.
Corral, F. M. del. *See* del Corral, F. M.
Corson, J. H., welding in wire industry, 493
Cosslett, V. E. *See* Nutting, J.
Cost, J. L. *See* Roberts, I.
Courtel, R., and **R. Léger,** specimen polishing in vacuum, 246
Cowan, R. J., continuous gas carburizing, 490
Cox, R. C., electric annealing of iron castings, 489
Coxon, T., *Paper*: "Electric Generation and Distribution in Iron and Steel Works," 327; biographical note, 351
Crafts, W., and **J. L. Lamont,** electron-microscope study of quenched and tempered steel, 288
Craig, W. F., jun. *See* Baeyertz, M.
Cramer, R. E., corrugation wear of rails, 116; fatigue tests on welded rail joints, 372; rail failures, 115, 372; shelling cracks on rails, 372; testing machine for rails, 116
Crawford, D. B. *See* Roberts, I.
Crede, J. H., and **J. P. Martin,** magnetic characteristics of nickel–iron alloy, 503
Crentz, W. L., Illinois coals, 356
Crivan, H. E., core-bonding materials, 232
Cross, A. H. B., trends in cupola and converter linings, 485
Crow, T. B., hot-dip galvanizing, 111; low-temperature brittleness, 164
Crowden, Doris, stress/strain curves, 371
Crussard, C., martensitic transformations, 505
Crussard, C., and **F. Aubertin,** X-ray precision measurement of grain lattice, 123
Cuckow, F. W., and **J. Trotter,** electron-microscope study of steels, 122
Cullen, O. E., homogeneous carburizing, 234
Cullen, G. V., and **J. E. Marshall,** determination of clay substances in moulding sands, 232
Cullum, L., jun. *See* Begeman, H. L.
Cummings, A. D., historical developments in fuel technology, 253
Cuthbertson, J. W., electrodeposited alloy finishes, 239
Czolgos, E. P. *See* Sirovy, G.

Daeves, K., and **W. Holtmann,** behaviour of nitrogen in converters, 230
Dale, J. J., electrodeposit structure, 495
Damiron, P., sheet, strip, and tinplate industries of western Europe, 368
Dancy, T. E., and **N. J. de Jersey,** carbonization assays, 103
Danilchenko, A. N. *See* Gubkin, S. I.
Dankov, P. D., and **N. A. Shishakov,** size of iron crystals and oxide films, 124
Darken, L. S., gases in steel, 504
Darmois, G., statistical methods in metallurgy, 509
Darsey, V. M., metal cleaning and finishing, 111
Das, S. S., and **A. L. Roberts,** torsion tests on silica refractories, 104
Dastur, M. N., and **J. Chipman,** hydrogen/oxygen equilibrium in liquid iron, 120
Datsenko, O. V. *See* Usatenko, Iu. I.
Davies, B. *See* Hicks, J. C.
Davies, E. A., Cwmfelin works of Richard Thomas and Baldwins, Ltd., 105
Davies, R. M., ball determination of yield stresses, 501
Davis, D. H., froth flotation of coal slurries, 356
Davis, J. D. *See* Toenges, A. L.
Davis, J. D., D. A. Reynolds, R. E. Brewer, D. E. Wolfson, and **W. H. Ode,** carbonizing properties of Virginian coals, 481
Day, S. D., pipeline coatings, 111
Dean, K. C., and **K. C. Vincent,** concentrating manganese ores, 356
Deas, R. E. and **Lillian T. Conradi,** determination of total carbon, 252
De Barr, A. E., biographical note, 350
De Barr, A. E., and **B. Roberts,** *Paper*: "The Determination of the Texture of Rolled Sheet from X-Ray Diffraction Photographs," 285
de Bruin, C. A. *See* Lobry de Bruin, C. A.
D'Entremont, B. Hedde, Mohr's-circle determination of stresses, 115
De Eulis, J., radiant-tube heater, 356
de Jersey, N. J. *See* Dancy, T. E.
DeJuhasz, K. J., graphical analysis of impact, 501
de Kerversau, E. *See* Bastien, P.
Delaney, R. J., centrifugal casting of cast-iron pipes, 233
Delastre, M. J., electrical cold-rolling equipment, 492
Delbart, G., iron and steel research abroad, 253; metallurgical research in France, 509; organization of ferrous research in France, 383
Delbart, G., and **M. Ravery,** effect of load on creep rate, 376
del Corral, F. M., eutectoid-zone transformations, 247
de Leiris, H., conditions for semi-brittle fracture, 502
de Long, W. B., and **E. V. Peterson,** polymerized-ethylene spray gun, 112
de Lucas Ortueta, R., and **J. M. H. Botas,** high-frequency heating, 491
Dementev, Kh. N., testing machines, 114; weight of testing machines, 241
Denison, G. H., and **P. C. Condit,** oxidation of lubricating oils, 109
Denison, G. H., and **O. L. Harle,** high-temperature oxidation of oils, 109
de Paiva, G. *See* Dorr, J. van N., II.
Derge, G., gases in steel, 504
Deribéré, M., crack detection by fluorescence, 115
Desalme, R., electrolytic detection of paint-film breakdown, 240
Desch, C. H., developments and applications of special steels, 377; effect of impurities on metal properties, 121
Deschars, C., shrink fitting, 235
Diamond, E. L., *Paper*: "Characteristics of Scrap in Relation to Bulk Handling," 452; *Paper*: "Proposal for the Modification of a Blast-Furnace Top to Give Controlled Burden Distribution, 173, 485; Ablett Prize award, 476; charging scrap, 361
Diaz, E. P. *See* Torrojo, J. M.
Dickie, H. A., Bessemer practice at Corby, 105
Dickinson, E. C., core binders, 232
Dickinson, T. A., enamel spraying, 499
Dickman, J. *See* Byers, R. C.
Diehlman, G., A. J. Eickhoff, and **T. G. Wills,** preparing and painting metal surfaces, 111
Dieterly, D. C., permeability testing of Epstein samples, 374
Dietrich, Theresa L. *See* Rolle, C. J.
Digges, T. G. *See* Jenkins, W. D.
Dipper, M., cold pressing shells, 366
Dolan, T. J., F. E. Richart, jun., and **C. E. Work,** effect of stress-amplitude fluctuations on fatigue life, 373
Donelson, J. G., and **R. Neish,** cottonseed oil on tinplate, 497
Doremus, E. P., G. L. Doremus, and **M. E. Parker, jun.,** cathodic protection, 507
Doremus, G. L. *See* Doremus, E. P.
Dorn, J. E., fracture of ductile metals, 114
Dorr, J. van N., II., C. F. Park, jun., and **G. de Paiva,** Brazilian manganese deposits, 481
Dorstewitz, G., Siegerland ore fields, 355
Doskář, J., sliding properties of cast iron, 117
Doughty, F. T. C., ore concentration, 356
Dowd, J. J. *See* Toenges, A. L.
Drahos, F. R., non-destructive testing of oil-well equipment, 504
Drake, F. E., petroleum gas in steel industry, 357
Draminsky, P., crankshaft damping, 118
Dravnieks, A., and **H. J. McDonald,** gas/metal reactions, 380; high-temperature corrosion, 124
Drew, R. L., flat-fielded reflecting micro objectives, 378
Driessen, M. G., hydraulic cyclones in coal-preparation plants, 356
Driscoll, W. J., cupola design and practice, 488; effect of coke quality on cupola performance, 362
Drucker, D. C., plastic-deformation theories, 114
Dubovoí, V. Ya., and **V. A. Romanov,** effect of hydrogen on steel properties, 244
Dudavskii, I. E., heat-conductivity determinations in refractories, 228
Dufaud, R. *See* Eugène, F.
Dulis, E. J. *See* Smith, G. V.
Dummet, G. A. *See* Botham, G. H., *also* Thirsk, R. F.
Dunn, C. G., and **W. W. Martin,** cubic-crystal orientation, 123
Dunn, F. *See* Angus, H. T.
Dunphy, R. P. *See* Myskòwski, E. T.
Duran, L. Aguet y. *See* Aguet y Duran, L.
Durer, A., phosphate coatings as aids to drawing, 367
Durrer, R., electric smelting, 167; oxygen-enriched blast, 359; pig-iron production in 1948, 382
Dwyer, P., casting roll grinder, 364
Dyke, E. *See* Bagshawe, B.

Eaton, S. E., R. W. Hyde, and **M. H. Rood,** radio-active-tracer study of coke sulphur, 482
Ebner, J. J., combined carburizing and martempering, 491
Eckel, E. J., and **S. J. Paprocki,** determination of austenitic grain-size, 378
Edelshtein, S. A., and **V. I. Petatskii,** excess-phosphate determination in boiler water, 382
Eden, G. E., biographical note, 476
Eden, G. E., and **G. A. Truesdale,** *Paper*: "Treatment of Waste Waters from the Pickling of Steel," 281
Edmundson, D., magnetic sheet steel, 117
Edwards, A. B., and **M. F. Glaessner,** mineral resources in Pacific islands, 227
Edwards, C. A., strain-age-hardening, 502
Edwards, H., disposal of spent acid pickling liquor, 86
Eeckhout, J., spectrographic analysis of slags, 381; spectrographic analysis of 18/8 steel, 125
Efanov, N. I. *See* Smolyarensko, D. A.
Eggers, U. *See* Eilender, W.
Ehrenberg, J. P. *See* Hamaker, J.
Eickhoff, A. J. *See* Diehlman, G.
Eilender, W., H. Arend, U. Eggers, and **F. Sadrazil,** electrolytic-polishing electrolyte, 111

Eilender, W., H. Arend, and **E. Schmidtmann,** effect of chromium plating on fatigue strength, 373; elastic modulus of chromium coatings, 496
Eisenkolb, F. suitability of drawing lubricants, 369
Eisler, B., drawing tools, 366
Elin, L. V., and **E. Sh. Ryt,** rapid testing for resistance to sea-water corrosion, 248
Elinson, M. M., and **F. M. Chistyakov,** vacuum ball mill for gas extraction, 251
Eliseev, A. A., and **A. N. Chervyakov,** works laboratories, 509
Elliott, G. D., Hadfield medal award, 475; *see also* Chesters, J. H.
Ellis, G. C., biographical note, 477; *see also* Kenneford, A. S.
Elm, A. C. *See* Kittelberger, W. W.
Elsea, A. R. *See* Herres, S. A.
Elter, E. H., Luxembourg iron-ore industry, 355
Emicke, O., cold rolling wide strip, 368
Engalichev and **Ositkovskaya,** determination of manganese, 251
Engelbaugh, H. E., welded pipe, 493
Engelhardt, W., enamelling defects, 499
Engelhardt, W., and **R. Neuf,** electrolytic-polishing apparatus, 122
Engels, G. *See* Naeser, G.
Engemann, H. E., pyrites treatment for pig-iron production, 105
Engstrand, E. R., K. M. Gleszer, and **J. W. Polonetz,** scope and limitations of powder metallurgy, 113
Entremont, B. Hedde D'. *See* D'Entremont, B. Hedde.
Enzian, G. H. *See* Feigenbaum, S.
Eppelsheimer, D. S. *See* Chubb, W., jun.
Erck, L. J. *See* Brown, W. E.
Erdman, D. C. *See* Smith, Rebecca H.
Eshelby, J. D., dislocations as cause of damping, 375
Esin, O., fused-silicate electrolytes, 231
Esin, O., and **V. Kozheurov,** oxygen distribution between metal and basic slag, 106
Esme, A., manganese in cast irons, 378
Estevez, J. M. J., plastics as bonding agents, 232
Estulin, G. V., transformations in austenitic alloys, 506; *see also* Borzdyka, A. M., Sviridova, Z. A.
Eubanks, P. E., complex deoxidizers, 488
Eugène, F., and **R. Dufaud,** cutting tools working in compression, 111
Euler, H., age distribution of iron and steel personnel, 383
Eulis, J. De. *See* De Eulis, J.
Euw, M. von. *See* von Euw, M.
Evans, U. R. *See* Mayne, J. E. O., *also* Wanklyn, J. N.
Evans, V., pickling- and plating-tank linings, 111
Everhart, J. O., firing of refractories, 104
Evlanova, A. V., *p*H determination of industrial effluents, 509
Eyring, H., J. W. Frederickson, and **D. McLachlan, jun.,** flow of solid metals, 114

Faessler, C., Labrador iron-ore deposits, 227
Fahlenbrach, H., magnetic investigations of iron–chromium alloys, 374; permanent-magnet compacts, 374
Fahlenbrach, H., and **K. Sixtus,** Pauschal non-magnetic states, 117
Fainberg, M. M., automatic analysis of gases in industry, 252
Fairbanks, H. V. *See* Kapnicky, J. A.
Faist, C. A. *See* Wyman, C.
Farnsworth, W. M., alloy electric-steel practice, 488
Farren, E. F., casting grinding balls, 364
Farrington, G. E., mandrel-type hot-strip coiler, 368
Fast, J. D., diffusion in metals, 376; hydrogen in arc welding, 110; oxygen and nitrogen in arc welding, 110
Fastje, D., Krupp-Renn plant, 105
Fastovskii, V. G., and **A. E. Rovinskii,** gas analyser, 508
Fayles, R. R., scrap charging in open-hearth, 486
Fedurkin, V. V. *See* Kudryavtsev, N. T.
Feeley, J. C., jun., red-iron-ore mine in Alabama, 356
Feigenbaum, S., and **G. H. Enzian,** nitrogen in steel, 120
Feitknecht, W., attack of metals by halogen halide vapours, 125
Fellget, P. B., dynamic impedance in thermocouples, 104
Fenton, E. A. *See* Stern, I. L.
Ferry, M. *See* Laurent, P.
Fiek, G., steel-structure load calculation, 373
Field, M., and **M. E. Merchant,** discontinuous-chip formation in cutting, 110
Figour, H., weld microstructures, 370
Filimonov, L. N., "flashes" of spectrum lines, 251; sparking in spectrum analysis, 381, 508
Fischer, W. A. *See* Bardenheuer, P.
Fitterer, G. R., acid electric slags, 486; acid open-hearth steelmaking, 486
Fitterer, G. R., J. G. Bassett, and **J. B. Kopec,** acid open-hearth efficiency, 486
Fitterer, G. R., and **J. W. Linhart,** comparison of thermocouple and pyrometer for liquid-steel-temperature measurement, 486
Fitterer, G. R., J. W. Linhart, J. B. Kopec, and J. G. Bassett, acid steelmaking processes, 486
Fleming, D., annealing-plant design and operation, 89
Fletcher, L. S. *See* Tour, S.
Flinn, A. V., *Paper*: "Heavy Forging Manipulators," 463
Folkhard, E., welded-structure stresses and tests, 238
Fomina, A. M. *See* Valdman, V. L.
Fontana, M. G., and **F. H. Beck,** passivity of 18/8 steel, 248
Fontana, M. G., and **W. A. Luce,** corrosion testing by high-velocity fluid, 249
Föppl, O., residual-stress determination, 502
Ford, W. F., and **W. J. Rees,** CaO–MgO–Cr_2O_3 system, 358
Ford, W. F., and **J. White,** CaO–MgO–Cr_2O_3 system, 483
Forestier, H., and **J. P. Kiehl,** influence of gas adsorption on oxide reactions, 124; solid-oxide reactions in vacuum, 120
Formánek, J., briquetting Sokolov lignite, 481
Forti, F., multiple casting of iron flywheels, 233
Foxwell, G. E., dry cooling of coke, 482
France-Lenord, A., damascened swords, 509
Frankau, A. M., Ablett Prize award, 476
Fraser, T. *See* Good, J. E.
Frederickson, J. W. *See* Eyring, H.
Freeman, J. W. *See* Reynolds, E. E.
Freeman, J. W., E. E. Reynolds, and **A. E. White,** rupture-test characteristics of heat-resistant alloys, 119
Frey, M. L., steel specifications, 378
Frick, K., enamel coatings on steel, 498
Fried, M. L., and **G. Sachs,** notched-bar tests on annealed specimens, 372
Frumin, I. I., measurement of corrosion of welded joints, 124
Frye, S. C., priming paints, 499
Furkert, P. A., flame-hardening gears, 366
Fuwa, K., and **S. Ito,** wear of silica brick, 483

Gable, J. G., magnetic strain gauge, 502
Galloway, J. W., coil handling, 492
Galperin, F. M., atomic magnetic moments and interatomic distances, 243
Gal'perina, S. A. *See* Rigberg, Ya. L.
Gandrud, B. W. *See* Toenges, A. L.
Gardam, G. E., electrodeposition of nickel, 239
Gardener, D. A. *See* Colin, R. H.
Gardner, J., dust control in foundry, 365
Garside, D. H., corrosion testing, 123
Gas Research Board, flame research, 103
Gaty, F., inoculation of cast iron, 106
Gaugler, E. A., soft magnetic materials, 117
Gavrilov, A. I. *See* Karklitt, A. K.
Gavrish, D. I. *See* Chuprinko, E. S.
Gay, A. F. *See* Stringer, J.
Geer, M. R., and **H. F. Yancey,** coal washing 356
Generozov, B. A., determination of carbon, 508
Gensamer, M. *See* Klier, E. P.
Gerasimenko, I. N. *See* Lapitskaya, E. M.
Gernelle, H., air-flow measurement in cupola, 362; white cast iron for crushing plant, 378
Gertsman, S. L., anti-piping materials, 363
Giannone, A., refractories resistance to sudden temperature changes, 228
Gibson, K. S., spectrophotometry, 508
Gilbertson, W. F., annealing-furnace covers, 89
Gilde, W., ingot-mould life, 231
Gillet, H. W., low-carbon 18/8 steel, 124
Gillies, F. M., rolling of sections and rails, 367
Gindin, E. I. *See* Prokhvatilov, V. G.
Gintsburg, Ya. S., and **N. D. Zaitsev,** creep-testing machine, 243
Ginzburg, S. A., tube electrometer, 507
Girschig, R., statistical control in spectrographic analysis, 508
Glaser, F. W., electrical-resistivity measurements on iron–silicon compacts, 113
Glauberman, A., deformation of metal crystal lattice, 246
Glazova, A. I., gaseous cementation, 490
Glazova, A. I., and **E. I. Nikitina,** determination of carbon, 250
Glazunov, A., and **R. Jirkovský,** determination of sulphur, 250
Glick, C. E., and **R. E. Harlepp,** induction-heating handling equipment, 108
Glikman, L. A., and **E. M. Shevandin,** isotropy of rolled steel in relation to brittle failure, 501
Glocker, R., *Book*: "Materialprüfung mit Röntgenstrahlen unter besonderer Berücksichtigung der Röntgenmetallkunde," 127
Glocker, R., and **H. Hasenmaier,** X-ray photography of hardened and nitrided steels, 116
Göbel, J., water-excluding coatings, 113
Godfrey, J. H. *See* Lewis, D.
Goehring, E. J. *See* Wyman, C.
Goetchius, D. R., titanium enamel, 498
Gohn, G. R., and **E. R. Morton,** high-speed testing machine for sheet, 115
Goldberg, M. M., and **N. D. Tomashov,** testing anti-corrosive paints, 499
Goldschmidt, H. J., interplanar spacings of carbides, 247
Gombel, H., X-ray tubes, 504
Goncharov, V. V. *See* Kolechkova, A. F.
Goncharskaya, A. F. *See* Goncharskii, L. A.
Goncharskii, L. A. and **A. F. Goncharskaya,** imbalance of A.C. bridges, 483
Gonser, B. W. *See* Campbell, I. E.
Good, J. E., A. Abreu, and **T. Fraser,** Brazilian coal industry, 356
Goodman, D., mobile X-ray tester for railway equipment, 504
Goodwin, W. P., Australian steel industry, 230
Görrissen, J., *Paper*: "Some Notes on Brittleness in Mild Steel." *Discussion*, 163. *Author's Reply*, 165
Gottardi, M. T., determination of chromium, vanadium, and manganese, 250
Götzl, F. *See* Bablik, H.
Goujou, J., elasticity and plasticity, 502
Graf, O., testing plug welds, 238
Graff, E. von. *See* von Graff, E.
Graham, T. R. *See* Van Zante, R. D.
Grainger, J. A., light presswork, 366
Granik, Z. I. *See* Vainshenker, I. I.
Grant, N. *See* Carney, D. J.
Grant, N. J., *Corrigendum*, 483
Gray, B., properties of olivine, 171
Greatbach, A. R., radiology, 118
Greenough, G. B., residual lattice strains in extended polycrystalline aggregates, 372
Greenwood, H. W., design in powder metallurgy, 500; progress in powder metallurgy, 370

Gregg, S. J., phase changes in adsorbed-gas films, 376
Grewe, H., and **F. Harders**, behaviour of graphite and carbon in fireclays, 228; silica cement, 228
Grigorovich, V. K., hardness calculations, 503
Grivet, P., electron microscope in metallurgy, 245
Grossman, N., pearlitic structures and transition temperatures, 121
Grove, W. P., radio-active materials, 118
Groves, J., annealing-plant design and operation, 90
Groves, W. T., dew-point as basis of furnace-atmosphere control, 234
Gubkin, S. I., A. N. Danilchenko, and **V. G. Osipov**, ductile rupture by shearing in compression, 500
Gude, W. G., farm-equipment foundry, 488; textile-machinery foundry, 365
Gudkova, T. I., N. E. Karskii, and **G. I. Sobolev**, microlattice study of alloy microplasticity, 242
Guédras, M., colloidal clays, 490
Guertler, W., surface attack, 379
Gueussier, A., and **R. Castro**, influence of essential parameters on deformation of isotropic metals, 374
Guillaumeron, P., hydrogen from coke-oven gas, 103
Gulbranson, E. A., oxidation of metals, 124
Guldner, W. A., long-distance gas distribution, 482
Gulyaev, A. P., cutting-temperature determinations, 110; effects of alloying elements on high-alloy austenitic steels, 244
Gulyaev, A. P., and **E. F. Trusova**, prolonged hardness testing, 242
Gunther, D. W., cupola heat balance, 362
Gurevich, M. G., and **Ya. M. Kots**, determination of CO_2 in air, 252
Guthmann, K., cold producer gas, 482; liquid-metal-temperature measurement, 357
Gwathmey, A. T., H. Leidheiser, and **G. P. Smith**, single-crystal behaviour, 249

Hackerman, N., and **H. R. Schmidt**, adsorption of corrosion inhibitors, 124
Hacking, R. A., electric steelmaking, 169
Haenel, J. G., hoe manufacture in Brazil, 109
Hager, K. F. *See* Michel, J. M.
Hall, H. G., graphitization in malleable process, 363
Hall, J. H., machine moulding, 364
Halls, E. E., phosphate coatings, 498
Halmshaw, R., gamma radiography, 118
Hamaker, J., and **J. P. Ehrenberg**, volatiles in bituminous coal, 356
Hamilton, S. B., history of cast-iron structures, 252
Hamming, W. J. *See* McCabe, L. C.
Hansen, G., high-velocity impact testing, 501
Hansen, M., blast-furnace flue-dust deposition, 229; gas velocity in blast-furnace, 360; gate valves in flues, 356
Hanson, D. *See* Ko, T.
Harders, F. *See* Grewe, H.
Haringx, J. A., notched-bar research on steel-plating brittleness, 241
Harle, O. L. *See* Denison, G. H.
Harlepp, R. E. *See* Glick, C. E.
Harley, W. F., boiler-plant corrosion, 381
Harris, G. T., ultrasonic testing, 118
Harris, J. C., metal-cleaning abstracts, 495
Harris, J. C., R. E. Kamp, and **W. H. Yanko**, radio-active-tracer study of metal cleaning, 111
Harrison, J. L., monolithic converter refractories, 484
Harrison, T. S., and **H. Storr**, determination of chromium, 382
Harrod, J. E., oxygen in electric steelmaking, 487
Hartjenstein, R., tube deformation in sizing mill, 368
Hartley, A., biographical note, 94; *see also* Preece, A.
Hartley, J. C., and **E. K. Mull**, ultrasonic inspection, 118
Harvey, E. B., supply of linseed and castor oils, 232
Harwood, J. J., and **F. Schulman**, corrosion research in U.S. Navy, 125
Haselden, G. G. *See* Newitt, D. M.
Hasenmaier, H. *See* Glocker, R.
Hauser, M., ceramic/metal powder mixtures, 500
Hauth, F., handling problems in rolling mills, 237
Havens, R. *See* Potter, G. M.
Hayden, F. L., materials handling in wire mill, 491
Heal, H. T., and **J. Savage**, X-ray study of phase changes at high temperatures, 378
Heine, R. W., deoxidation of white cast iron, 363; effect of deoxidation treatments on graphitization, 363
Hellbrugge, H., oxygen-enriched blast, 359
Hemingway, E. L., superfinishing abrasives, 239
Hempel, M., influence of yield point on fatigue strength, 242
Henderson, H. M., biographical note. *Frontispiece*
Henglein, H. *See* Nowotny, H.
Henry, J. B., heat-resisting steels, 120
Henry, O. H., and **G. E. Claussen**, *Book*: "Welding Metallurgy. Iron and Steel," 254
Henry, P. E., iron-ore sintering, 356
Hensel, F. R., and **E. F. Holt**, resistance-welding laboratory, 110
Herbruck, C. G., submerged-arc welding, 110
Herbst, H., alternating bend test for haulage cables, 373
Herdle, A. J., and **H. J. Wolthorn**, analysis of refractories, 252
Herres, S. A., and **A. R. Elsea**, temper brittleness in low-alloy steels, 117
Herrmann, R. H., materials handling in core-room, 107
Herzog, E., corrosion cracking in nitrate solutions, 248; slag-mixing steel-making processes, 230
Heyer, R. H., effect of testing speeds with stainless steels, 114
Hicks, J. C., and **B. Davies**, high-temperature properties of magnesia, 104
Hiersig, H. M., increasing gear efficiency, 369
Hilbert, H. L., stamping shops, 366
Hilditch, T. B., natural drying oils, 232
Hill, E. G., increasing production in open-hearth, 106
Hiller, W., heat-treatment, 365
Hilty, D. C., refining of chromium steel, 487
Hinsley, J. F., X-ray methods, 118
Hipple, M. L. *See* Begeman, H. L.
Hird, U. W., stress-relief welding of ships, 366
Hitchcock, W. D., safety equipment for electric furnaces, 486
Hitt, W. C., ultrasonic testing, 118
Hoar, T. P., protection against corrosion, 112
Hoare, W. E., hot tinning, 496; rolling oils in annealing, 90
Hobson, A. C., open-hearth auxiliary equipment, 105
Hodges, L. A., and **E. Bishop**, Buckle flame-cutting torch, 238
Hodsman, H. J. *See* Prasad, S. M.
Hoeckelman, R. F. *See* Campbell, I. E.
Hogberg, C. G., blast-furnace design, 104
Holden, H. A., phosphate-coating methods, 113
Holt, E. F. *See* Hensel, F. R.
Holt, G. J., beneficiation of iron ore, 481
Holt, M. L. *See* Seim, H. J.
Holtmann, W. *See* Daeves, K.
Honda, K., pearlite formation, 123
Honour, A. H. *See* Corbett, B. D.
Hopkins, R. K., cladding by electric fusion, 487; Kellog hot-top process, 487; Kellog ingot process, 487
Horikawa, K. *See* Sato, T.
Horoszko, E., electrostatic cleaning of blast-furnace gas, 357
Hotot, G., determination of hydrogen, 250 *see also* Lacombe, M.
Houben, K. *See* Clas, G.
Howard, A. J., *Book*: "Canning Technology," 383
Howard, J. C., high-frequency induction heating, 108
Howat, D. D., lean-ore practice, 102; oxygen in open-hearth, 106
Howat, J. T., oxy-acetylene flame-hardening, 366
Howlett, J. *See* Archer, H. R.
Hudson, J. C., corrosion of ferrous metals, 124
Hughes, D. F., and **R. G. Voysey**, deposits in gas turbines, 253
Hughes, E. C., J. D. Bartleson, and **M. L. Sunday**, corrosion test for oils, 237
Hulse, C., and **R. J. Sarjant**, heat transfer in metallurgical furnaces, 107, 365
Humble, H. A., cathodic protection in sea water, 507
Huppert, P. A., improving enamels by lithium, 240; lithium compounds in titania enamels, 240
Hurst, J. E., addition of tungsten to cast iron, 245
Hüttig, G. F., adsorption capacity and corrosion, 380
Huttle, J. B., iron ores of Eagle Mountain, 227
Hutton, J. A. D., protective coatings, 497
Hyde, R. W. *See* Eaton, S. E.

Ianovici, V., Roumanian ore reserves, 227
Ihlen, A., properties and uses of olivine, 171
Ihrig, H. K., attack of hydrogen/nitrogen mixtures, 507
Ikenberry, L. C., and **J. J. Canfield**, determination of nickel on coated steel, 496
Imbembo, E. A. *See* Kahn, N. A.
Indelli, A. *See* Cavallero, L.
Instituto del Hierro y del Acero, activities, 481
Isaev, N. G., localized spectrum analysis, 381
Ito, S. *See* Fuwa, K.
Iturrioz, D., foundry organization, 488; solidification of castings, 107
Iurevskaya, N. P. *See* Onusaitis, B. A.
Ivanov, B. V. *See* Belyankin, D. S.
Ivashchenko, M. S. *See* Rigberg, Ya. L.
Izvekov, I. V., interferometer for analysis of argon/nitrogen mixtures, 508

Jaboulay, B. E., perchloric determination of chromium and vanadium, 381
Jackson, K. L., plastic strains in sheet, 367
Jacobson, N. B. *See* Butaev, F. I.
Jacoby, R. H., and **M. Petty**, oxygen in acid electric practice, 487
Jacquet, P. A., electrolytic polishing, 494; microscopical detection of temper brittleness, 378; safe use of perchloric polishing baths, 494
Jaffe, L. D., *Paper*: "Carbide Distribution as a Possible Cause of Temper Brittleness," I, 503; biographical note, 94; *see also* Buffum, D. C.
Jaffe, L. D., E. L. Reed, and **H. C. Mann**, discontinuous-crack propagation, 114
Jane, S., pattern-shop organization, 233
Jaswon, M. A., and **J. Mazur**, X-ray line breadths of martensite, 506
Jeffes, J. H. E. *See* Richardson, F. D.
Jeffrey, R., examinations of mining-gear failures, 115
Jellinghaus, W., effect of heat-treatment on magnetic properties of chromium steel, 117; hysteresis of permanent-magnet materials, 503; isothermal transformation of austenite in chromium magnet steel, 123
Jennings, A. C., infra-red heating, 233; use of gas in foundries, 488
Jennings, R. F., *Paper*: "Blast-Furnace Gas Cleaning," 305; biographical note, 351
Jenkins, W. D., and **T. G. Digges**, creep of cold-drawn ingot iron, 504
Jensen, R. S., fatigue tests on manganese steel, 372; fatigue tests on rail joints, 116; fatigue tests on rail webs, 116; fatigue tests on railway fishplates, 372

Jepson, M. D. *See* Thompson, F. C.
Jepson, M. D., and **F. C. Thompson,** *Paper*: "The Acceleration of the Rate of Isothermal Transformation of Austenite." *Discussion*, 165. *Authors' Reply*, 167
Jérémine, Elisabeth, and **M. Lelubre,** Sahara meteorite, 253
Jersey, N. J. de. *See* de Jersey, N. J.
Jirkovský, R. *See* Glazunov, A.
Johansson, A., creep behaviour, 376
Johnson, A. E., cast steel at high temperatures, 120; creep and relaxation at high temperaturcs, 376
Johnson, B. K., microscope for use in ultraviolet light, 245
Johnson, E. A., creep relaxation tests, 120
Johnson, H. E. *See* Boulger, F. W.
Johnson, V. H. *See* Toenges, A. L.
Johnston, B. G. *See* Chang, F. K., *also* Osborn, C. J.
Johnston, S. S., electrolytic tinplate, 497
Jolivet, H., decomposition of austenite, 506
Jolley, T. R. *See* Toenges, A. L.
Joly, G., annealing-pot life, 364; effect of chromium on graphitization, 376
Jonas, G. J., oil-burner control, 483
Jones, E., and **K. R. Maslen,** resistance strain gauges, 502
Jones, F. W., *See* Lavender, J. D.
Jones, F. W., and **W. I. Pumphrey,** free energy and metastable states in iron–nickel and iron–manganese systems, 379
Jones, W. P., Venturi scrubber, 483
Joyce, D., blast-furnace operation, 105
Juhasz, K. J. De. *See* DeJuhasz, K. J.
Jupe, J. H., electronic measurement and control of heat, 357

Kachik, E. A. *See* Bayer, R. O.
Kadell, A. E., tinplate production, 496
Kaessberg, H., cast forging dies, 366
Kahn, N. A. *See* Ames, B. N.
Kahn, N. A., and **E. A. Imbembo,** notch sensitivity of ship plate, 372
Kainarskii, I. S., and **I. S. Smelyanskii,** thermal stability of Dinas, 228
Kalinsky, J. *See* Stern, I. L.
Kalling, Bo., and **J. Stalhed,** Wiberg-Söderfors sponge-iron process, 485
Kaluzny, I., world marketing of steel, 253
Kamp, R. E. *See* Harris, J. C.
Kapnicky, J. A., H. V. Fairbanks, and **W. A. Koehler,** adherence of glass to metals, 509
Kargin, A. M., and **V. I. Tkachenko,** determination of sulphur in blast-furnace slags, 508
Karklitt, A. K., and **A. I. Gavrilov,** protective glazes, 358
Karskii, N. E. *See* Gudkova, T. I.
Karskii, N. E., and **T. I. Sobolev,** bend tester for small loads, 500
Kassem, M. A., electric smelting, 360
Katsugase, T., blow-hole formation, 233
Katz, W., unsuitable application of chromium steel, 380
Kay, H., annealing-plant design, 90
Kazanov, G. W., and **V. A. Toropov,** gas-cutting machine, 238
Keetch, W. A., rubber/metal bonding, 108
Kegel, K., induction heating in surface treatment, 234
Keller, F., power for straight-line shearing, 237
Keller, G., electric furnaces, 366
Keller-Wylenmann, G., low-shaft electric smelting, 359
Kelley, K. K., correlation of high-temperature heat data, 375
Kennedy, F., utilization of by-product gases, 482
Kennedy, T. H., and **A. W. Thornton,** sulphur control in the blast-furnace, 105
Kennedy, W. R., spectrographic determination of magnesium, 382
Kenneford, A. S., biographical note, 351
Kenneford, A. S., and **G. C. Ellis,** *Paper*: "A Comparison of Six Spring Steels," 265
Kenyon, J. N., fatigue testing, 242; wire-testing machines, 373
Kerr, H., and **A. Taylor,** life of coke-oven batteries, 103
Kerversau, E. de. *See* de Kerversau, E.
Kessels, K. *See* Wesemann, F.
Kharlamova, K. N. *See* Kudryavtsev, N. T.
Khazanovich, K. K., iron-ore deposits in Petrosavodsk district, 227
Khitrik, S. I., material and heat balances for ferrosilicon furnace, 231
Khokhlov, D. G., effect of sinter properties in small blast-furnace, 229
Khotkevich, V. I. *See* Kostenets, V. I.
Khruschov, M. M., and **M. A. Babichev,** three-roller fatigue-testing machine, 373
Kieffer, R., and **F. Benesovsky,** new-type sintered alloys, 370; wear-resistance of hard metals, 114
Kiehl, J. P. *See* Forestier, H.
Kiessler, H. *See* Bollenrath, F.
Kimmel, A. L., cathodic protection, 125
King, R., furnace and boiler-tube corrosion, 248
Kipnis, S., Kh. *See* Rogelberg, I. L.
Kirillov, P. G., forging impact, 235
Kirkham, E. C., spot identification of alloy steels, 252
Kitahara, S., ferric chloride method for determination of iron, 252
Kittel, H., silicone, 369
Kittelberger, W. W., and **A. C. Elm,** iron anode and cathode phenomena, 506
Kivin, D. I. *See* Kukolev, G. V.
Klärding, J., conservation of manganese, 360
Klaybor, L. V., hot-drawing drill rod, 235
Kleandr, A., welding time studies, 369
Klein, F., steel-foundry refractories, 358
Klein, K. J. F., silica foundry refractories, 484
Kleinberg, A. T., wear of chrome-magnesite, 483
Klemm, H., graphical presentation of quaternary systems, 379; microstructures of iron–carbon system, 378
Klemm, W., *Book*: "Inorganic Chemistry," Parts IV and V, 126, Part VI, 510
Klier, E. P., F. C. Wagner, and **M. Gensamer,** fracture tests on ship plate. *Corrigendum*, 483
Klinger, P., oxygen-determination methods, 250
Klinger, P., and **O. Schliesmann,** spectrochemical spot analysis, 251
Klinov, I. Ya, and **G. L. Shvarts,** corrosion of stressed structural steels, 248
Klyachko, Iu. A., developments in analytical chemistry in Russia, 250
Knappwost, G. A., dielectric determination of humidity in moulding sands, 232
Knickerbocker, R. G. *See* Van Zante, R. D.
Knudsen, K. E. *See* Chang, F. K.
Ko, T., biographical note, 94
Ko, T., and **D. Hanson,** *Paper*: "Grain-Boundary Phenomena in Severely Heated Steel," 51, 505
Kocho, V. S., temperature and carbon in open-hearth bath, 231
Koehler, W. A. *See* Kapnicky, J. A.
Koenigsberger, F., *Book*: "Welding Technology," 254
Kolbe, F., electrostatic producer-gas cleaner, 357
Kolechkova, A. F., and **V. V. Goncharov,** Podol'sk lightweight refractories, 357
Konovalova, A. B. *See* Suprunovich, I. B.
Kootz, T., blast-furnace-slag viscosity, 229
Kopec, J. B. *See* Fitterer, G. R.
Kopecki, E. S., Kellog ingot process, 361; tube reheating furnace, 107; *see also* Lloyd, T. E.
Korolev, P. G., centrifugal velocity impact testing machines, 114; testing large piston rings, 121
Koritskii, V. G., emission spectra analysis in U.S.S.R., 251
Korol'kova, O. M. *See* Kudryavtsev, N. T.
Körös, B., ingot-mould life, 488
Korzh, P. D. *See* Borovkov, V. V.
Korzh, P. D., and **A. V. Kozlova,** spectroscopic determination of silicon, 382
Kostarev, A. I., superfine structure of X-ray absorption spectra, 246
Kostenets, V. I., B. G. Lazerev, V. I. Khotkevich, and **M. G. Shikhman,** low-temperature impact-viscosity determination, 241
Kostron, H., metallographic grain-size measurement, 378
Kots, Ya. M. *See* Gurevich, M. G.
Kovtun, M. S. and **A. D. Ogorodnyaya,** estimation of slag basicity, 361
Kozakevitch, P., synthetic-slag studies, 361
Kozheurov, V. *See* Esin, O.
Kozlova, A. V. *See* Korzh, P. D.
Kozlovich, I. Z., effects of oxygen-enriched blast, 359
Kraemer, M. H., iron and steel industry in Russian occupied zone of Germany, 382
Krainer, H., and **R. Mitsche,** carbides in vanadium steel, 247
Krainer, H., and **K. Swoboda,** influence of diffusion annealing on steel properties, 500
Krainer, H., K. Swoboda, and **F. Rapatz,** low-alloy hot-working steels, 119
Krämer, W., roll heating and cooling, 368; sheet-mill mechanization, 109
Krause, D. E., and **H. W. Lownie, jun.,** cupola design and operation, 362; effect of blast moisture on cupola performance, 362
Krekeler, K., metal spraying, 497
Kreuzberg, E. C., corrosion tests at Kure Beach, 124
Krisch, A. *See* Pomp, A.
Krisch, A., and **A. Pomp,** recovery in creep testing, 120
Krongauz, Y. S., and **N. I. Nazerevsky,** production of power transformer sheets, 366
Krouse, D. H., flowmeter for pickling acids, 494
Krümmel, K. *See* Opitz, H.
Krupitskii, B. A., influence of change of state on plastic deformation, 242
Krushel, L. E., kaolin refractories, 483
Krynitsky, A. I., and **H. Stern,** effect of boron on cast iron, 121
Kuba, J., spectrographic determination of aluminium and titanium, 250
Kudelya, E. S., standard samples for spectrum analysis of metals, 251
Kudryavtsev, N. T., O. M. Korol'kova, and **V. V. Fedurkin,** nickel plating, 496
Kudryavtsev, N. T., A. J. Lipovetskaya, and **K. N. Kharlamova,** electrogalvanizing with Zincate electrolytes, 496
Kudryavtsev, N. T., and **A. A. Nikiforova,** throwing power of Zincate electrolytes, 496
Kufferath, K., cadmium coating, 496
Kuhlmann, Doris, G. Masing, and **J. Raffelsieper,** recovery from deformation, 372
Kukaczka, R. *See* Bablik, H.
Kukolev, G. V., and **D. I. Kivin,** dolomite brick, 104
Kukolev, G. V., and **L. G. Mel'nichenko,** wet grinding refractory materials, 357
Kunin, L. L., flow of liquid metal, 231
Küntscher, W., quality control in steelworks, 376
Kurdyumov, G. V., and **O. P. Maksimova,** low-temperature austenite/martensite transformation, 247
Kuritsyna, A. D. *See* Berkovich, E. S.
Kvalheim, A., properties and uses of olivine, 171

Laborde, M., metallurgical history of Guipuzcoa region, 253
Labouvie, E., electrostatic producer-gas cleaning, 357
Lachenaud, R. *See* Matte, G.
Lacombe, M., and **G. Hotot,** Gotta oxygen-determination method, 250

Lacombe, P., and **A. Berghezan,** recrystallized metal crystals and crystal inclusions, 247
Lacomble, M., and **M. Nepper,** oxygen determination in liquid steel, 381
Lamont, D. A. *See* McKie, W. M.
Lamont, J. L. *See* Crafts, W.
Lamport, B. J., roll cooling and lubrication, 237
Lamson, H. W., hysteresis core-loss equations, 375
Landfermann, C. A., absorption properties of paints, 499; radiation of refractories, 228
Lang, Ruth, *Book*: "Laboratory and Workshop Notes," 511
Lannan, J. L., titanium enamels on titanium steels, 498
Lankford, W. T., hydraulic bulge testing of sheet, 372
Lansing, J. H. *See* Tilley, M.
Lapitskaya, E. M., and **I. N. Gerasimenko,** electrodes for arc-welding stainless steels, 110
LaQue, F., corrosion prevention, 379
Larsen, R. G. *See* Thorpe, R. E.
Lasky, S. G., and **B. N. Webber,** Arizonian manganese resources, 481
Laszlo, F., local overstraining of metals, 372
László, F., *Paper*: "Tessellated Stresses," 5, 502; biographical note, 94
Laurent, P., transformation phenomena, 505
Laurent, P., and **M. Ferry,** graphitization of white irons, 363
Lauderdale, R. H., induction hardening ball races, 234
Lavender, J. D., and **F. W. Jones,** banding, 123
Lay, J. O., reproducibility in chemical analysis, 249
Lazerev, B. G. *See* Kostenets, V. I.
Lee, L. *See* Chesters, J. H.
Lees, E., producer-gas and dust analysis, 252
Leckie, A. H., electric steelmaking, 169
Legendre, M. *See* Brun, M.
Léger, R. *See* Courtel, R.
Lehmann, E., Lahn-type iron-ore deposits, 355
Leidheiser, H. *See* Gwathmey, A. T.
Leigh, W. *See* Montgomery, W. E.
Leiris, H. de. *See* deLeiris, H.
Lelubre, M. *See* Jérémine, Elisabeth
Lembersky, H. K. *See* Silverman, L.
Lemmon, D. C. *See* Roos, P. K.
Lendl, A. E., fin prevention in rolling, 109
Lenel, F. V., compressibility testing of metal powders, 113
Lenhart, C. H., blast-furnace practice at Fontana, 360
Lennard, G. J., absorptiometric determination of alloying constituents, 250
Leon, A., ultrasonics, 118
Leroy, P. *See* Michaux, R.
Levy, M. E., electrographic identification of alloys, 381
Lewis, D., and **J. H. Godfrey,** back-pull wire drawing, 491
Lewis, K. G., welding high-pressure vessels, 238
Liebmann, H., J. W. Price, and **S. R. Thompson,** coating weights on tinplate, 495
Lifshits, I. M., scattering of short waves by crystal lattice, 246
Lifshifts, M. M., and **O. A. Minenko,** determination of free sulphur in solid fuels, 382
Liger, J., chemical pickling iron and iron alloys, 111; silver plating of steel, 112
Likharev, K. K., stress diagrams, 500
Lillico, J. W., *Book*: "Blacksmith's Manual Illustrated," 383
Lillieqvist, G. A., complex deoxidizers, 487
Lilly, P. D., cyanide heat-treatment layout, 234
Lindemann, R., non-destructive testing, 114
Linhart, J. W., slag controls of acid open-hearth heats, 486; *see also* Fitterer, G. R.
Linsley, H. E., electroplating, 111
Lipovetskaya, A. J. *See* Kudryavtsev, N. T.
Lippert, T. W., development of reversing hot-strip mill, 109
Lipson, C., calculation of fatigue life, 116
Lipson, C., G. C. Noll, and **L. S. Clock,** effects of fillets, etc., on fatigue strength, 115
List, H. *See* Werner, M.
Liu, Y. H. *See* Owen, E. A.
Livermore, J. S. *See* Wells, F. G.
Livshits, A. S., and **M. I. Shchepak,** roll profilometer, 236
Livshits, D. E. *See* Mirkin, I. L.
Lloyd, E. H. *See* Thompson, H.
Lloyd, F. N., electric steelmaking, 169; properties and uses of olivine, 172
Lloyd, T. E., and **E. S. Kopecki,** cold extrusion of steel, 235
Lobry de Bruin, C. A. *See* Carrière, J. E.
Logan, H. L., effect of chromium plating on endurance limit, 503
Lokotosh, P. I. *See* Shofman, L. A.
Lamos, J., electron microscope, 378
Long, W. B. de. *See* de Long, W. B.
Longenecker, C., Aliquippa Works, 360; analysis and testing of refractories, 485
Lord, W. M., core-bonding practice abroad, 232; gases from cores, 232
Loria, E. A., structure of cast alloy steels, 122
Love, R. J. *See* Mills, H. R.
Low, B. B., *Book*: "Strength of Materials," 127
Low, J. R., jun., and **T. A. Prater,** ductility measurement on sheet, 372
Lowenheim, F. A., anodic behaviour in tinplating, 497
Lownie, H. W., jun., *See* Krause, D. E.
Lowson, J. C., infra-red heating, 233
Lucas Ortueta, R. de. *See* de Lucas Ortueta, R.
Luce, W. A. *See* Fontana, M. G.
Ludwig, J. N., complex deoxidizers, 488
Luppenlatz, J. W., cast steels at sub-zero temperatures, 120
Lynn, H. W., continuous hot-dip galvanizing of strip steel, 112
Lysaght, J., annealing-plant design and operation, 90

McBride, J. E., conveyors for strip coils, 237
McCabe, L. C., A. H. Rose, W. J. Hamming, and **F. H. Viets,** dust and fume standards, 510
McComb, J. C., forging large anvils, 235; forging plant, 491
McConnell, D. C., wire-drawing plant and operations, 235
McCutcheon, D. M., radio-active gauge for indicating liquid-metal level, 362
McDonald, H. J., pulse polarizer in corrosion technology, 380; *see also* Dravnieks, A.
McElgin, J., drawing compound, 237
McElgin, J. A., liquid salt baths, 108
McGranahan, C. L., strip and sheet production, 368
Machu, W., chromatizing of phosphate coatings, 498; electrodeposited phosphate coatings, 497; manganese phosphate coatings, 498; phosphate-coating kinetics, 498
Mackenzie, J. *See* Chesters, J. H.
Mackey, E. L., rotary gang slitting, 492
McKie, W. M., and **D. A. Lamont,** electronic equipment in iron and steel industry, 368
Mackiewicz, J. C., production of modified cast iron, 232
McLachlan, D., jun. *See* Eyring, H.
McLean, D. *See* Trotter, J.
McLean, G. M., wire ropes, 509
McLennan, I. M., tinplate production, 236
McReynolds, A. W., effects of strains on martensitic transformation, 506
Magliano, G. *See* Sapegno, C.
Maguire, J. J. *See* Betz, L. D.
Mahl, H., electron microscope in metallurgy in Germany, 245
Mahon, R. C., centrifugal concrete lining of piping, 112
Maier, H. J., modified fatigue-testing technique, 373
Maincon, P. *See* Ballay, M.
Makolin, I. A., adsorption balance, 507
Maksimova, O. P. *See* Kurdyumov, G. V.
Maksimov, S. K., influence of notch preparation on toughness, 501
Malov, S. I., determination of tungsten by specific gravity, 382
Mann, H. C., *See* Jaffe, L. D.
Mansell, R., metal-spraying mine equipment, 113
Marbaker, E. A., H. S. Saunders, and **L. N. Baumer,** effects of electrolytes on titania enamels, 498
Mardon, H. H., and **M. D. Brisby,** traffic analysis in iron and steel works, 383
Mardon, H. H., H. A. Chapman, and **M. D. Brisby,** *Paper*: "The Traffic of Iron and Steel Works," 425
Margolin, S. D., calculation of skin effect, 243
Marier, P. *See* Cohen, M.
Marimon, R. J., metallic coatings, 495
Mario, O., effect of aluminium on grain-size of steel, 244
Marles, D. *See* Angus, H. T.
Marshall, D. F., Williams Prize award, 476
Marshall, J. E. *See* Cullen, G. V.
Marshall, J. R., gas cleaning, 104
Marshall, W. K. B., argon-arc welding, 238
Martin, A. E. *See* Zuppan, E. C.
Martin, D. C. *See* Voldrich, C. B.
Martin, J. A., infra-red drying of enamels, 240
Martin, J. L. *See* Wallace, J. F.
Martin, J. P. *See* Crede, J. H.
Martin, K. H., utilization of coke-oven gas in Germany, 357
Martin, W. W. *See* Dunn, C. G.
Masing, G., plastic deformation, 502; *see also* Kuhlmann, Doris
Maslen, K. R. *See* Jones, E.
Massari, S. C., graphitizing behaviour of white iron, 363
Mather, R., electric-smelting plant, 170
Matte, G., and **R. Lachenaud,** progress in metallography, 372
Matteson, E. A., electrolytic pickling, 494
Matthews, (Sir) Arthur, biographical note, *facing* 256
Matveev, G. A. *See* Selisski, Y. P.
Maurer, E. *See* Connert, W.
Mavrocordatos, C. *See* Russell, T. F.
Mayer, J., metallurgical processes, 486
Mayer, M., standard surface-finish samples, 494
Maynard, C. A., and **J. E. Mitch,** testing magnetic materials, 374
Mayne, J. E. O., *Paper*: "Cementiferous Paints," 289
Mayne, J. E. O., and **U. R. Evans,** painting wet steel surfaces, 499
Mayorcas, R., gas-temperature measurement, 357
Mayre, L., Bedeaux system, 383
Mazur, J., grain-size of martensite after low-temperature treatment, 378; structure of tempered martensite, 123; *see also* Jaswon, M. A.
Mead, J. C. *See* Stanley, A.
Médard, L., P. A. Jacquet, and **R. Sartorius,** hazards with perchloric polishing baths, 494
Medovar, B. I. *See* Asnis, A. E.
Medzihibozkskii, M. Ya., blowing air into open-hearth bath, 230
Mehl, R. F. *See* Ransom, J. T.
Meier, Cortés, E., gas carburetting with coke-oven gas, 361
Meissner, J., bedding of ores or coals, 356
Mel'nichenko, L. G. *See* Kukolev, G. V.
Melnik, V. I., and **R. G. Schneiderov,** deformation of blast-furnace shells during welding, 238
Melnitsky, B., identification of engineering materials, 383
Mendizza, A. *See* Compton, K. G.
Merchant, M. E. *See* Field, M.
Merrill, T. W., effects of additions to steel, 245
Meuth, H. O. *See* Siebel, E.

Meyer, A. J. P., gyromagnetic constant of iron and nickel, 118
Meyer, F., obituary notice, 480
Meyer, W. S., sprayed coatings, 497
Meyers, F. *See* Michaux, R.
Miall, L. M. *See* Miall, S.
Miall, S., and **L. M. Miall,** *Book*: "A New Dictionary of Chemistry," 255
Michalos, G. P., oxygen in electric steelmaking, 487
Michaux, R., P. Leroy, F. Meyers, and **F. Renard,** rate of blowing basic converter, 486
Michel, A., cobalt in steels and alloys, 245, 377; martensitic quench and tempering, 506
Michel, J. M., and **K. F. Hager,** corrosion-inhibited fuels, 507
Michie, G. M., comparison of X-ray, gamma-ray, and ultrasonic methods, 119
Milazzo, G., automatic temperature regulation, 357
Miletich, A. F. *See* Abramov, F. A.
Miller, H. H., wire-peening, 494
Mills, H. R., and **R. J. Love,** fatigue strengths of cast crankshafts, 115
Mills, J. F., powder metallurgy, 370
Milner, J. W., overhead cranes, 369
Milone, A. *See* Baratta, F.
Minchin, L. T., electrolytic corrosion of underground pipelines, 125
Minenko, O. A. *See* Lifshits, M. M.
Ministry of Fuel and Power, dry cooling of coke, 482
Mirakyan, V. M. *See* Baliuk, S. T.
Mirkin, I. L., and **D. E. Livshits,** high-temperature hardness testing, 503
Mirolyubova, E. V. *See* Poluboyarinov, D. N.
Miropol'skaya, G. L. *See* Miropol'skii, L. M.
Miropol'skii, L. M., and **G. L. Miropol'skaya,** iron-ore deposits in Gorkov district, 355
Mishima, T., and **T. Mitsuhashi,** cobalt additions to nickel–chromium steels, 245; fractures in steel, 241; graphitization of chromium–copper cast irons, 244; hardening cracks, 241
Mitch, J. E. *See* Maynard, C. A.
Mitchell, J., brittleness in mild steel, 164; Bessemer medal award, 475
Mitsche, R., alloy systematization, 374; *see also* Krainer, H.
Mitsuhashi, T. *See* Mishima, T.
Mochalkin, R. I., deformation of steel parts in heat-treatment, 490
Molchanova, E. K. *See* Shraiber, D. S.
Molinié, M. J., lightweight refractories, 359
Möller, H. *See* Neerfeld, H.
Montereau, P., special steels, 230
Montgomery, W. E., W. Leigh, and **W. H. Phillips,** tungsten carbide dies, 491
Moore, E. C., economics of castings and weldings, 238
Moore, R. S., effect of oxygen on open-hearth refractories, 358
More, C., nodular cast irons, 377
Moreau, L., determination of oxygen, 250
Morisset, P., wear resistance of hard chromium coatings, 112
Morley, J., electron-microscope study of metal powders, 246
Morning, J. L. *See* Stevens, W. W.
Morrison, K. G., and **D. Cornwall,** hot die steels, 365
Morton, E. R. *See* Gohn, G. R.
Mueller, J., die sinking, 491; drop-forging dies, 366
Mueller, L. R., local induction heating of sheet, 491
Muhlenbruch, C. W., elastic and fracture toughness of stainless steel, 377
Mulders, E. M. J., temperature regulation in laboratory furnaces, 104
Mull, E. K. *See* Hartley, J. C.
Müller, A., standardizing costing, 383
Müller, B. M., electric smelting plant at Mo i Rana, 170
Müller, E. A. W., magnetic-powder testing; 243
Muller, F., W. Eilender, and **K. M. Wagner,** chromium plating with superimposed alternating current, 112
Müller, F. H. *See* Schottky, H.
Munse, W. H. *See* Wilson, W. M.
Murphy, R. K., metallurgical education in Australia, 253
Murray, P., monolithic converter refractories, 484
Murray, W. M., and **L. W. Niedrach,** determination of carbon, 382
Murski, C., roll-design calculations, 236
Murty, L. N., absorptiometric determination of silicon, 250
Mussgnug, G., properties of weathered blast-furnace slags, 360
Myers, F. W., welding electrodes, 492
Myskowski, E. T., and **R. P. Dunphy,** nodulizing alloy, 489

Nabarro, F. R. N., dislocation theory of slip, 502
Naeser, G., and **G. Engels,** radiation measurements on liquid steel, 357
Naeser, G., and **W. Pepperhoff,** flame spectrum in Bessemer converter, 230; radiation power of refractory bricks, 228
Nazerevsky, N. I. *See* Krongauz, Y. S.
Neerfeld, H., and **H. Möller,** fluctuating tensile stresses, 116
Neish, R. *See* Donelson, J. G.
Němec, J., coated electrodes, 492
Nepper, M. *See* Lacomble, M.
Nethaway, F. R., gaseous nitriding, 490
Neuf, R. *See* Engelhardt, W.
Neumann, G., gas-producer specifications, 482; steam-jet blowers for gas producers, 103
Neumeyer, M., gas-cyaniding automobile parts, 235
Newbury, B. C., costing heat and power, 103
Newby, M. P., refractory wear and converter design, 484.
Newell, W. C., freezing of horizontal steel castings, 91
Newitt, D. M., and **G. G. Haselden,** production of oxygen, 253
Newman, M. W., internal inspection of tubes, 503
N'Guyen, T. C., precision X-ray camera, 243
Nicaise, A., welded blast-furnace shell plates, 369
Nichols, D. G. *See* Tolansky, S.
Nicolas, M. P., ganister linings for cupolas, 484
Nicolas, P., colloidal clays, 490; foundry cores, 490
Niebch, G. *See* Pomp, A.
Niebch, G., and **J. Brockhaus,** cold work hardening of low-carbon strip, 501
Niedrach, L. W. *See* Murray, W. M.
Nijhawan, B. R., grain-size control, 234
Nikiforova, A. A. *See* Kudryavtsev, N. T.
Nikitina, E. I. *See* Glazova, A. I.
Nikitina, O. I., spectrum analysis of basic slags, 381
Nikolaev, R. S., and **L. M. Shkolnik,** pulsator testing of gear teeth, 503
Nilsson, A. H., obituary notice, 479
Noll, G. C. *See* Lipson, C.
Normand, A., sodium hydride pickling, 111
Noskov, M. M., laboratory-furnace temperature regulator, 483
Noskov, S. E., electrolytic tool sharpening, 111
Nowotny, H., and **H. Henglein,** ternary phosphorus alloys, 506
Nuñez, A. V., weldability of shipbuilding steels, 370
Nutting, J., biographical note, 95; *see also* Preece, A.
Nutting, J., and **V. E. Cosslett,** replica technique for electron microscopy, 246; stripping of Formvar replicas, 246
Nye, J. F., photoelastic studies with silver chloride, 115

Obzhirov, I. A., hydraulic dynamometers, 500
Ode, W. H. *See* Davis, J. D.
O'Donnell, H. J. *See* Toenges, A. L.
Oelsen, W., steel/slag reactions, 361; thermodynamics of iron alloys, 379
Offenhauer, C. M., and **J. F. Collins,** effects of zirconium in cast iron, 376
Ogan, A. C., oxygen in electric steelmaking, 487
Ogburn, F., E. R. Weaver, and **W. Blum,** influence of humidity on corrosion, 249
Ogorodnyaya, A. D. *See* Kovtun, M. S.
Oldfield, J. H., spectrographic study of localized heterogeneity, 251
Oliver, D. A., brittleness in mild steel, 154
Olson, G. R., and **H. V. Beezley,** cathodic protection, 380
Onchukov, N. M. *See* Bernshtein, M. L.
O'Neill, H., metallurgical education in Great Britain, 253
Onusaitis, B. A., and **N. P. Iurevskaya,** fluorescent detection of coke cracking, 482
Opitz, H., and **K. Krümmel,** superfinish grinding, 493
Orlova, N. S. *See* Smirnov, V. I.
Orr, C. P., wire-drawing lubricants, 237
Ortueta, R. de Lucas. *See* de Lucas Ortueta, R.
Osborn, C. J., brittleness in mild steel, 164
Osborn, C. J., A. F. Scotchbrook, R. D. Stout, and **B. G. Johnston,** effect of plastic strain and heat-treatment, 500
Osipov, V. G., deformation characteristics, 502; *see also* Gubkin, S. I.
Ositkovskaya. *See* Engalichev
Ostroukhov, M. Ya., effect of coke density on blast-furnace performance, 229
Owen, E. A., and **Y. H. Liu,** X-ray study of iron–nickel equilibrium diagram, 379

Paiva, G. de. *See* de Paiva G.
Palatnik, L. S., X-ray determination o coating thickness, 495
Palmaer, Eva, chemistry of rust, 248
Palme, comparison of American and French rails, 245
Palmer, W. G., corrosion inhibitors, 379
Panseri, C., *Book*: "Manuale di Fonderia d'Alluminio," 384
Paprocki, S. J. *See* Eckel, E. J.
Parfenov, A. M., magnetizing roasting, 162
Park, C. F., jun. *See* Dorr, J. van N., II.
Parker, E. R. *See* Boodberg, A.
Parker, Ivy M., Kure Beach corrosion-testing station, 507
Parker, M. E., jun. *See* Doremus, E. P.
Parnham, H., ramming of acid refractories, 484; *see also* Brunt, F.
Parr, N. L. *See* Slater, I. G.
Paschkis, V., heat transfer in the foundry, 365; soldification studies, 365
Passano, R. F., increasing steel production, 230
Patchin, G., and **E. Brewin,** German iron and steel industry during 1939–45, 486
Patek, P., trimming tools, 366
Patrikeev, N. N., and **I. S. Shapiro,** Kerch iron-ore basin, 355
Patsoukov, N. G., and **P. A. Akolzine,** automatic determination of boiler brittleness, 248
Patten, P. G., cleaning sheet-metal pressings, 111
Pattison, R. F., clad steels, 112
Pawlek, F., development of magnetic materials, 374
Pearson, B. M., salt-bath furnaces for wire, 490
Pearson, J., disposal of spent acid pickling liquor, 85
Pearson, W. B., *Paper*: "Vanadium and Its Alloys," 149, 506; biographical note, 224
Penrose, J. H., and **Catherine T. Amond,** precision-cast milling cutters, 239
Pepperhoff, W. *See* Naeser, G.
Perch, M., and **C. C. Russell,** coal-classification method, 356
Peregud, E. A., determination of harmful gases, 252
Petafskii, V. I. *See* Edelshtein, S. A.

Peter, W., cooling capacity of liquid hardening media, 108
Peterson, E. V. *See* de Long, W. B.
Petit, D., variable-turbulence blast-furnace stoves, 485
Petrovskaya, T. F. *See* Scherbakov, A. A.
Petty, M. *See* Jacoby, R. H.
Phillips, W. H. *See* Montgomery, W. E.
Pieper, P., FE-ISOL coating process, 240
Pierce, E. W., gases in steel, 504
Pigott, E. C., steelmaking processes for castings, 489
Pilz, H. *See* Wickert, K.
Pinkhusovich, L. L., and **O. N. Uskova**, quality of open-hearth rails from Kerch, 245
Pirie, G. W., costing heat and power, 103
Pirogov, A. A., L. A. Tseithin, and **V. P. Rakina**, hot repair of Dinas, 483
Piryatinski, I. L., and **I. S. Schwartzmann**, spalling cracks in silica brick, 104
Planck, M., *Book*: "Scientific Autobiography and Other Papers," 127
Plotkin, N. Z., Iu. I. Usatenko, and **P. A. Bulakhova**, FeO determination in sinter, 381
Plumley, S., *Book*: "Oxyacetylene Welding and Cutting," 511
Podberezin, S. B., automatic regulation, 237
Podoinikova, K. V. *See* Chernyi, A. T.
Poensgen, W. C. F., electric steelmaking, 168
Pohlman, R., sound-vision testing, 118; ultrasonic testing, 375
Polakowski, N. H., *Paper*: "Compression Test in Relation to Cold Rolling." *Corrigenda*, 96; 236; Carnegie Medal award, 475
Pollard, R. D., H. Edwards, J. F. R. Jones, and **J. B. Davis**, *Paper*: "The Design and Operation of Annealing Plant for Mild-Steel Sheets and Coils." *Discussion*, 87
Poluboyarinov, D. N., and **E. V. Mirolyubova**, enriched coal ash for refractories, 359
Pomp, A., steel at high temperatures, 120; *see also* Boetteher, W., Krisch, A.
Pomp, A., J. Brockhaus, and **G. Niebch**, comparison of annealing processes for steel strip, 108
Pomp, A., and **A. Krisch**, case-hardening powders, 365; effect of tempering time on hardness, 108; tensile and notched-bar tests on alloy steels, 377
Poole, S. W. *See* Spencer, P. S.
Popil'skii, R. Ya., and **A. V. Smolya**, density of pressed refractories, 483
Porter, F. R., preparing steels for enamelling 111
Pospisil, R., microradiography, 123
Potten, A. J., and **G. C. H. Sharpe**, instrumentation for flue-gas analysis, 382
Potter, G. M. and **R. Havens**, concentration of Arizona manganese ores, 227
Pourbaix, M. J. N., *Book*: "Thermodynamics of Dilute Aqueous Solutions," 511
Pourchot, P., blast-furnace-gas preheating by boiler waste heat, 103
Prasad, S. M., G. H. Thompson, and **H. J. Hodsman**, producer-gas tars, 482
Prater, T. A. *See* Low, J. R., jun.
Preece, A., biographical note, 94
Preece, A., and **J. Nutting**, *Paper*: "The Detection of Overheating and Burning in Steel by Microscopical Methods," 46, 505
Preece, A., J. Nutting, and **A. Hartley**, *Paper*: "The Overheating and Burning of Steel," 37, 504
Přibyl, J., productivity in steel foundries, 232
Priester, M. U., treatment of electroplating wastes, 112
Priporova, G. P., effect of stress on Hall electromotive force, 242
Prokhvatilov, V. G., and **E. I. Gindin**, X-ray tube, 504
Prot, M., statistical analysis of safety factors, 509
Prutton, C. F., and **P. A. Asseff**, hypoid-gear lubricants, 110
Puel, P., nickel steels, 245
Pullin, V. E., safety measures with radon, 375
Pumphrey, W. I. *See* Jones, F. W.
Püngel, W., compressed-air cooling in wire patenting, 236
Pyke, R. *See* Cohen, M.

Que, F. La. *See* LaQue, F.

Rabinovich, M. E., centrifugal high-temperature testing, 376
Radavich, J. F., electron-microscope study of grain boundaries, 122
Radin, V. V., porosity determinations with ceramics, 104
Radżwicki, K., increasing open-hearth life, 230
Raffelsieper, J. *See* Kuhlmann, Doris.
Rakestraw, A. S., grinding in the foundry, 489
Rakina, V. P. *See* Pirogov, A. A.
Randall, M., creep and creep testing, 119
Ransom, J. T. *See* Roos, P. K.
Ransom J. T., and **R. F. Mehl**, statistical nature of endurance, 115
Rapatz, F. *See* Krainer, H.
Rapatz, F., and **J. Frehser**, effect of special nitrides on properties of high-speed tool steels, 377
Raub, E., and **B. Wullhorst**, electrodeposition of cadmium–zinc, 497
Ravery, M. *See* Delbart, G.
Reday, J. Z., iron and steel industry in Japan, 383
Reebel, D., continuous rod drawing, 367; hot-strip plant, 368; refractories research, 358
Reed, E. L. *See* Jaffe, L. D.
Rees, W. J., refractory life, 484; *see also* Ford, W. F.
Reese, D. J. *See* Schneidewind, R.
Reeve, L. *See* Bardgett, W. E.
Rehder, J. E., effects of temperature and silicon on blackheart-malleable annealing, 363; influence of silicon in cooling blackheart malleable, 363
Reichardt, P., blast-furnace throat diameter and behaviour of fines, 485; effect of throat diameter on blast-furnace-gas velocity, 229
Reiner, M., *Book*: "Deformation and Flow." 127
Reininger, H., melting steel scrap in the cupola, 106
Remin, V. P., ferrosilicon-hearth reactions, 231
Renard, P. *See* Michaux, R.
Reniger, V., gas-turbine materials, 244
Renne, I. P., deformation in plastic bending, 500
Renouard, M., statistical analysis of test data, 509
Reynolds, D. A. *See* Davis, J. D.
Reynolds, E. E. *See* Freeman, J. W.
Reynolds, E. E., J. W. Freeman, and **A. E. White**, properties of EME alloy discs, 121
Ricci, C., agglomerated ore in blast-furnaces, 104
Richard, K., strength of low-alloy heat-resisting steels, 119; *see also* Thum, A.
Richardson, E. B., gear materials, 121
Richardson, F. D., and **J. H. E. Jeffes**, blast-furnace thermodynamics, 359
Richardson, H. M., and **G. R. Rigby**, cordierite in blast-furnace hearths, 229
Richart, F. E., jun. *See* Dolan, T. J.
Rieppel, P. J. *See* Voldrich, C. B.
Rigberg, Ya. L., M. S. Ivashchenko, and **S. A. Gal'perina**, grog and grog/silicon-carbide shapes, 483
Rigby, G. R., foundry refractories, 484
Rigby, G. W., flame cleaning, 111
Riley, D. P., and **E. R. Segnit**, silicocarnotite in basic slags, 231
Riley, H. L. *See* Toenges, A. L.
Riley, R. V., Hypersilid alloy, 36
Rinaldi, F. *See* Bargmore, A.
Ritter, E., mixing Bessemer and electric steels, 231
Roberts, A. L. *See* Das, S. S.
Roberts, B., biographical note, 351; *see also* De Barr, A. E.
Roberts, C. C., automatic heat-treatment of welded pipes, 108
Roberts, C. C., and **C. A. Vogelsang**, thermoelectric pyrometry, 483
Robert, D. F. T. *See* Rollason, E. C.
Roberts, I., D. Aronson, M. Atcheson, L. C. Claitor, J. L. Cost, and **D. B. Crawford**, pilot oxygen plant, 509
Roberts, J. P., and **W. Watt**, ceramic bend and creep strengths, 228
Roberts, J. T., spot test for chemical resistance of enamels, 499
Robertson, F. L., and **M. W. Thring**, statistical analysis of open-hearth output, 106
Robinson, A., serpentine as open-hearth refractory material, 172
Rocca, R., oxygen-enriched blast, 360
Rocha, V. S. *See* Wilson, I. F.
Rockley, J. C., X-ray apparatus, 118
Rocquet, P., ingot-mould life, 488; mixer cements, 358
Rodes, R. C., *Book*: "Metales y Aleaciones, vol. I," 510
Roesch, K. *See* Zeuner, H.
Rogelberg, I. L., and **S. Kh. Kipnis**, solubility limits in binary metallic system, 247
Rogers, R. R., and **G. E. Viens**, cathodic protection, 380
Rogers, T. H., biological corrosion accelerators, 249
Roll, F., wear resistance of cores, 107
Rollason, E. C., and **D. F. T. Roberts**, *Paper*: "A Note on the Overheating of Steel," 422
Rolle, C. J., and **Theresa L. Dietrich**, evaluation of paint films, 499
Romanov, V. A. *See* Dubovoi, V. Ya.
Ronchi, V., microscopes, 505
Rood, M. H. *See* Eaton, S. E.
Roos, P. K., D. C. Lemmon, and **J. T. Ransom**, influence of machine types and other factors on fatigue-test data, 115
Root, C., gas-shielded welding of stainless cups, 370
Roper, E. H., Aircomatic welding pistol, 370
Rose, A. H. *See* McCabe, L. C.
Rose, K., drop forgings, 366; hardening malleable iron, 108; heavy-duty weldments, 238
Rosenblatt, D., heat-treating large steel castings, 108
Ross, B. G., press tools, 235
Ross, E. F., "trolley phones" in metallurgical plants, 369
Ross, H. U., electric-smelting furnaces, 360; iron-ore sintering, 102
Rossteutscher, F., oxalic acid treatment to facilitate drawing, 367
Rostovtseva, V. K. *See* Afanes'ev, A. S.
Roth, W., "water-casting," 233
Rothrock, H. E. *See* Toenges, A. L.
Rousse, G., treatment of water from blast-furnace-gas cleaning, 357
Rovinskii, A. E. *See* Fastovskii, V. G.
Rowan, M. J., metal spraying, 240
Rowbotham, P., magnetic testing, 118
Royer, M. B., and **A. J. Williams**, desulphurization by acid oxides, 360
Royston, L. K., freezing of horizontal steel castings, 91
Rozhkov, E. M. *See* Barkov, B. N.
Rüdiger, O., nuclear physics in ferrous metallurgy, 371
Rudorff, D. W., electric-spark machining, 494
Ruimonte, F. Gomez, determination of molybdenum, 252
Russell, C. C. *See* Perch, M.
Russell, T. F., and **C. Mavrocordatos**, *Paper*: "Experiences in the Study of Isothermal Transformations." *Discussion*, 165. *Authors' Reply*, 166

Rybalko, F. P., and **M. V. Yakutovitch,** plasticity in relation to surface finish, 242
Rylands, J. R., and **A. B. Tillotson,** costing heat and power, 103
Rynearson, G. H. *See* Wells, F. G.
Ryt, E. Sh. *See* Elin, L. V.

Sachs, G. *See* Fried, M. L.
Sadovskii, V. D., M. M. Shteinberg, S. I. Baranchuk, and **G. N. Bogacheva,** 234
Sadrazil, F. *See* Eilender, W.
Sage, R. S., coal-preparation plants, 356
Sakharov, P. S., iron–chromium–aluminium alloys for cold-rolled strip, 245
Salauze, J., nickel-bath impurities, 112
Saller, H. A. *See* Sims, C. E.
Salmang, H., expansion of refractories, 228
Salzberg, H. K., plastic binders in the foundry, 233
Samuel, D. L., corrosion preventives, 247
Samuel, P., Foundry Prize award, 93
Sandberg, S. W. *See* Bruckner, W. H.
Sandilands, W. A., wire production in France, 236
Sanson, T. B., resistance strain gauges, 502
Sapegno, C., and **G. Magliano,** heat-treatment of chromium steel, 234
Sarjant, R. J., technological education in coke-oven industry, 103; *see also* Hulse, C.
Sartorius, R. *See* Médard, L.
Sato, T., and **K. Horikawa,** cupola operation with poor-quality coke, 232
Sauerwald, F., physical systematization of liquid metals, 375
Saunders, H. L., G. B. Butler, and **J. M. Tweedy,** investigations on an experimental blast-furnace, 359
Saunders, H. L., and **R. Wild,** compensated charging in blast-furnaces, 105
Saunders, H. S. *See* Marbaker, E. A.
Savage, J., γ–α transformation in iron, 379; *see also* Heal, H. T.
Savage, L. H. W. *See* Brancker, A. V.
Savitskii, F. S., I. A. Zakharov, and **B. A. Vandyshev,** indentation cold-brittleness tests, 503
Schaaber, O., etching reagent for ferrous metals, 122
Scheifele, B. F. R., rust removal and prevention, 239
Scheil, M. A. *See* Schmitz, H. A.
Scherbakov, A. A., and **T. F. Petrovskaya,** *p*H determination with silver chloride electrode, 509
Scherer, R. *See* Connert, W.
Schetky, L. McD. *See* Winsor, L. P.
Schlesinger, G., surface-finish tests, 239
Schliesmann, O. *See* Klinger, P.
Schmid, E., plastic deformation, 502
Schmidt, A. O. *See* Armitage, J. B.
Schmidt, H. R. *See* Hackerman, N.
Schmidt, P. L. *See* Beiler, A. C.
Schmidt, W., chromium-plating milling-machine quills, 112
Schmidt, W. A., Cottrell precipitation, 482
Schmidtmann, E. *See* Eilender, W.
Schmitt, E., microstructure of iron castings, 365
Schmitz, H. A., and **M. A. Scheil,** alloy-steel linings for corrosive-liquor tanks, 380
Schneiderov, R. G. *See* Melnik, V. I.
Schneidewind, R., and **D. J. Reese,** influence of heating rate on white-iron graphitization, 363
Schoefer, E. A., magnetic properties of cast stainless steel, 503
Schofer, N., oil-refinery corrosion, 249
Scholefield, H. H., HCR magnetic materials, 242
Schottky, H., and **F. H. Müller,** hot electrode for local heating, 110
Schrader, H., Jominy testing, 503; *see also* Wentrup, H.
Schubert, H. R., *Paper*: "An Early Attempt at Trade-Unionism by Ironworkers in North Derbyshire, in 1814," 405; *Paper*: "The Earliest Use of Cast Iron in Machine Construction," 406; *Paper*:
Schubert, H. R.—*continued*.
"The Economic Aspect of Sir Henry Sidney's Steelworks at Robertsbridge, in Sussex, and Boxhurst, in Kent," 278; *Paper*: "The English Knife in the Early Middle Ages," 509; *Paper*: "The First Iron Handguns in England," 280; *Paper*: "The Pinners and Wire-Drawers of York, 1296–1762," 3, 509; Anglo-Saxon smith in about A.D. 1000, 253
Schulman, F. *See* Harwood, J. J.
Schulz, E. H., history of steel, 509
Schumacher, H., building materials from blast-furnace slag, 360
Schumann, F., rust prevention in water tanks, 248
Schwartz, H. A., static properties of cast steels, 377
Schwartzmann, I. S. *See* Piryatinski, I. L.
Schwarz-Bergkampf, E., arrangement of iron alloys, 123
Schwarzkopf, P., powder-metallurgy products, 113
Scotchbrook, A. F. *See* Osborn, C. J.
Scott, W. G., roll founding, 233
Searby, A., *Paper*: "Split Thermocouples," 36, 483
Sedlaczek, hot-rolling wide strip, 367
Sedlon, V. J., high-production pattern-making, 233
Seelig, R. P., martempering, 491
Seelmeyer, G., effect of phosphates on corrosion, 379
Seemann, H. E., nomogram for computing unsharpness in radiographs, 118
Seemann, H. J., corrosion-resistance testing under bending stress, 124
Segnit, E. R. *See* Riley, D. P.
Seidel, G. E., protective coatings, 495
Seim, H. J., and **M. L. Holt,** electrodeposition of molybdenum alloys, 497
Selisski, Y. P., and **G. A. Matveev,** magnetic permeability of transformer steels, 242
Selmeczi, B., gas-producer performance and slag composition, 482
Semenova, N. V., effect of nitrogen on EI319 steel, 120
Semik, I. P., blast-furnace-slag viscosity, 229
Senz, R. R., inspection of castings, 114
Seymour, H., feedwater corrosion, 125
Shands, E. H., direct cover-coat enamelling of steel, 240
Shapiro, I. S. *See* Patrikeev, N. N.
Sharpe, G. C. H. *See* Potten, A. J.
Shaw, H. L. *See* Boulger, F. W.
Shchepak, M. I. *See* Livshits, A. S
Shea, J. A., disintegration tests of blast-furnace refractories, 358; *see also* Snow, R. B.
Sheehan, J. P. *See* Baeyertz, M.
Sheinken, B. L., and **V. L. Tsegel'skii,** welded blast-furnace shells, 238
Shekter, V. Ya., additive deformations in calculation of resistance to rupture, 371
Shell, H. R., analysis of refractories, 382
Shepherd, B. F., isothermal diagrams, 379
Shepherd, H. H., cylinder-block production, 365
Shevandin, E. M. *See* Glikman, L. A.
Shibler, B. K. *See* Agey, W. W.
Shibler, B. K., and **H. D. Snedden,** concentration of Wyoming manganese ores, 227
Shields, J. J. *See* Toenges, A. L.
Shikhman, M. G. *See* Kostenets, V. I.
Shippey, B. A., determination of titanium and iron in ore, 251
Shirley, H. T., corrosion resistance in industrial atmospheres, 380
Shishakov, N. A., structure of y-Fe_2O_3.H_2O corrosion crystals, 124; *see also* Dankov, P. D.
Shisterman, K. A., and **O. A. Yakovleva,** photocolorimetric analysis of stainless steels, 381
Shkolnik, L. M., residual stresses in shot-peening, 502; *see also* Nikolaev, R. S.
Shmulevich, E. Ya., micro-analysis of blast-furnace slag, 252
Shneerov, Ya. A., lessening rimmed-steel heterogeneity, 230
Shofman, L. A., and **P. I. Lokotosh,** plastic bending, 500
Shoidovski, E. G. *See* Tikhonov, A. N.
Shrager, A. M., *Book*: "Elementary Metallurgy and Metallography," 255
Shraiber, D. S., and **E. K. Molchanova,** method for study of complex alloys with electron microscope, 246
Shteinberg, M. M. *See* Sadovskii, V. D.
Shumilin, A. A., strength of unfired magnesite, 357
Shvarts, G. L. *See* Klimov, I. Ya.
Sidorenko, Yu. P., and **K. K. Tomash,** Dinas production, 483
Siebel, E., and **H. O. Meuth,** notch effect with fluctuating load, 373
Sillers, F., jun., substitution of ferromanganese by electrolytic manganese, 107
Silverman, L., and **H. K. Lembersky,** nickel determination in cobalt-base alloys, 382
Sims, C. E., gases in steels, 504
Sims, C. E., H. A. Saller, and **F. W. Boulger,** effects of deoxidizers on sulphide inclusions, 246
Sirota, N. N., ferro-cementite system, 247
Sirovy, G., and **E. P. Czolgos,** mottle finishes on enamels, 499
Sixtus, K. *See* Fahlenbrach, H.
Skevington, H. C., weldability of high-tensile steels, 238
Skulari, P., metallurgical research at U.S.S.R. Academy of Science, 486; X-ray measurement of internal stresses, 486
Slater, I. G., and **N. L. Parr,** marine-boiler deterioration, 380
Smalley, O., casting design, 488
Smart, A., plating-plant design, 495
Smelyanskii, I. S. *See* Kainarskii, I. S.
Smelyanskii, I. S., and **V. D. Tsigler,** Dinas with manganese binder, 483
Smirnov, V. I., and **N. S. Orlova,** fine cracks in stainless steel, 121
Smith, A. Q., tube-making furnaces, 234
Smith, B. M., testing magnetic materials, 374
Smith, C. H., precision forging of turbine blades, 366
Smith, C. T. *See* Wells, F. G.
Smith, C. W., hardness testing of electrodeposits, 239
Smith, E. K., nodular iron, 489
Smith, G. P. *See* Gwathmey, A. T.
Smith, G. V., and **E. J. Dulis,** effect of production practice on creep-to-rupture tests, 244
Smith, H. L. *See* Toenges, A. L.
Smith, Rebecca, H., and **D. C. Erdman,** ultrasonic inspection, 118
Smith, W. G., ingots, 234
Smithells, C. J., *Book*: "Metals Reference Book," 255
Smoluchowski R., and **R. W. Turner,** influence of magnetic field on recrystallization, 378
Smolya, A. V. *See* Popil'skii, R. Ya.
Smolyarenko, D. A., and **N. I. Efanov,** production reserves of large open-hearths, 230
Snavely, C. A., chromium plating, 495
Snedden, H. D. *See* Shibler, B. K.
Snow, R. B., and **J. A. Shea,** ladle-nozzle erosion, 358
Sobolev, G. I. *See* Gudkova, T. I., *also* Karskii, N. E.
Soete, W., decohesion, 242; relaxation of residual stresses, 115
Somin, B. E., effects of aluminium and boron on steel hardenability, 116
Sorenson, W. F., local heat-treatment, 107
Sourdillon, A., isothermal decomposition of austenite, 505
Spangler, F. L., steam tempering, 108
Spann, L. R. *See* Tilley, M.
Spektor, A. G., transformation velocity in solid metals, 247
Speller, F. M., prevention of corrosion in water, 248

Spencer, L. F., machining stainless steel, 111; nitriding, 366
Spencer, P. S., and **S. W. Poole,** austenite transformation in stainless steels, 379
Spenlé, E. A., cogging mills for special steels, 367
Springer, R., surface treatments before coating, 125
Sproule, D. O., ultrasonic testing, 118
Stager, H., friction and lubrication, 109
Stalhed, J. *See* Kalling, Bo.
Stanley, A., and **J. C. Mead,** sintering fine magnetite, 356
Stap, M., clay as sand binder, 490; cupola theory and practice, 106; moulding-sand control, 107
Staub, F., gear steels, 377
Steer, A. T., metal surfaces, 239
Steffes, M., blast-furnace-stove tests, 485
Steinberg, R. H., and **H. J. Belic,** analysis of silica refractories, 252
Steinitz, R., effect of sintering temperature on magnetic properties of iron compacts, 374
Stenvik, K. J., *Paper*: "The Properties of Olivine and Its Uses for Refractories and Moulding Sands." *Discussion*, 171. *Author's Reply*, 172
Stern, H. *See* Krynitsky, A. I.
Stern, I. L., J. Kalinsky, and **E. A. Fenton,** gas evolution from welds, 508
Stevens, C. E., jun., bonding steel to cast aluminium, 112
Stevens, C. L., and **G. Vennerholm,** hot extrusion methods, 109, 235
Stevens, W. W., and **J. L. Morning,** steel from sponge iron, 361
Stevenson, A., steel-foundry practice, 489
Stewart, K. H., effect of tension on magnetization curves, 374
Stieber, V., obituary notice, 479
Stiles, J. B., metallizing in marine engineering, 113
Stone, G. D., oxygen in steelmaking furnaces, 361
Storr, H. *See* Harrison, T. S.
Stout, R. D. *See* Osborn, C. J.
Stringer, J., *Paper*: "Blast-Furnace Gas Cleaning," 294; metering of liquid-fuel flow, 356; *see also* Brancker, A. V.
Stringer, J., and **A. F. Gay,** metering liquid-fuel flow, 103
Stubblefield, B. M., production of pig iron, 485
Stützel, H., forsterite linings, 228
Sucksmith, W., ferromagnetism, 117
Summers, J. W., obituary notice, 480
Summers-Smith, D., ball mills for metal powders, 114
Sunday, M. L. *See* Bartleson, J. D., *also* Hughes, E. C.
Suprunovich, I. B., and **A. B. Konovalova,** colorometric determination of copper, 251
Svahn, O., milling cutters, 239
Svenson, O. *See* Thum, A.
Sviridova, Z. A., and **G. V. Estulin,** permeability of austenitic steel, 243
Swan, A. W., statistical analysis in heavy industry, 509
Swartz, J. C., titanium enamels on titanium steel, 498
Swift, H. W., sinking in tube drawing, 367
Swindin, N., pickling and liquor recovery, 494; recovery of pickle liquor, 86
Swoboda, K. *See* Krainer, H.
Syskov, K. I., gas permeability of blast-furnace coke, 229

Tabor, D. *See* Bowden, F. P.
Tabor, D., and **E. D. Tingle,** attack by fatty acids, 369
Taganov, K. I., spectrum analysis of metallic coatings, 251
Tartaron, F. X., iron-ore beneficiation, 102
Taylor, A. *See* Kerr, H.
Taylor, D. B. C. *See* Warnock, F. V.
Taylor, E. W., phase-contrast microscope, 122
Taylor, H. G., welding research, 492
Taylor, J., *Paper*: "The Diffusion of Carbon and the Carburization Process," 257; *Paper*: "The Influence of Gas/Solid Temperature Differences on Blast-Furnace Operation," 129, 485; biographical note, 351
Taylor, S. J. G., ring-balance flowmeter, 103
Teed, P. L., properties of metals under stratospheric conditions, 120
Tenenbaum, M., effect of sulphur on steel properties, 377
ter Berg, J., and **G. J. van Wijnen,** weld porosity, 238
Terrington, J. S., *Paper*: "Structural Frames for Melting-Shops," 195, 486
Tettweiler, R., coking heat, 482
Thrisk, R. F., G. H. Botham, and **G. A. Dummett,** heating corrosion specimens, 507
Thomas, O. J., cooling of mild steel in annealing, 87
Thomas (Richard) and Baldwins, Ltd., *Book*: "R.T.B. Methods of Analysis," 128
Thompson F. C., *See* Jepson, M. D.
Thompson, F. C., and **M. D. Jepson,** *Paper*: "The Breakdown of Austenite below the Ms Temperature," 27, 506
Thompson, F. R., and **F. J. Waldschutz,** flash welding wide strip, 369
Thompson, G. H. *See* Prasad, S. M.
Thompson, H., and **E. H. Lloyd,** temperature measurement, 104
Thompson, S. R. *See* Liebmann, H.
Thornton, A. W. *See* Kennedy, T. H.
Thorpe, R. E., and **R. G. Larsen,** anti-seizure properties of boundary lubricants, 109
Thring, M. W. *See* Robertson, F. L.
Thum, A., and **K. Richard,** damage curves in creep tests, 243
Thum, A., and **O. Svenson,** effects of notch combinations, 115
Tibbs, C. E., dielectric-loss heating of foundry cores, 233
Tietz, H. *See* Werner, M.
Tigerschiöld, M., coke consumption in blast-furnaces, 105
Tikhonov, A. N., and **E. G. Shoidovski,** continuous casting, 233
Tilley, M., W. M. Albrecht, L. R. Spann, and **J. H. Lansing,** machining malleable iron, 110
Tillotson, A. B. *See* Rylands, J. R.
Tingle, E. D. *See* Tabor, D.
Titov, V. I., polarographic vessel, 252
Tkachenko, V. I. *See* Kargin, A. M.
Tödt, F., local-cell activity on metal surfaces, 379; oxide formations on metal surfaces, 506
Toenges, A. L., J. J. Dowd, L. A. Turnbull, J. D. Davis, H. L. Smith, and **V. H. Johnson,** coal deposits of Colorado, 482
Toenges, A. L., L. A. Turnbull, T. R. Jolley, J. J. Shields, H. L. Smith, H. J. O'Donnell, H. M. Cooper, R. F. Abernethy, B. W. Gandrud, H. L. Riley, and **H. E. Rothrock,** coal deposits of Alabama, 482
Tofaute, W., clad steel for acid-resisting vessels, 377
Tolansky, S., and **D. G. Nichols,** distortion by diamond hardness indenters, 374
Tolley, G., metal-surface reactions, 380
Tomash, K. K. *See* Sidorenko, Yu. P.
Tomashov, N. D. *See* Goldberg, M. M.
Tömösközy, J., properties of Hungarian sands, 107
Toropov, V. A. *See* Kazonov, G. W.
Torrojo, J. M., E. P. Diaz, and **J. L. Amoros,** Torrojo X-ray camera, 505
Tour, S., and **L. S. Fletcher,** hot-spot machining, 110
Towler, F. H., heavy hydraulic presses, 108
Townend, G. H., micro-hardness tester with inverted microscope, 374
Tozer, A. W. *See* Benns, H. V.
Triché, H., influence of cementite on iron spectra, 381
Tricker, R. E., metals in clock and instrument making, 509
Trinks, W., oxygen in open-hearth, 486
Trots, A. A., and **M. S. Maksimenko,** ferrosilicon, 231
Trotter, J., electron micrographs, 122; *see also* Cuckow, F. W.
Trotter, J., and **D. McLean,** *Paper*: "Electron Microscope Study of Quenched and Tempered Steel," *Correspondence*, 288. *Authors' Reply*, 288
Trotter, J., D. McLean, and **C. J. B. Clews,** electron-microscope study of iron–carbon alloys, 246
Truesdale, G. A., biographical note, 476; *see also* Eden, G. E.
Trusova, E. F. *See* Gulyaev, A. P.
Tschäppät, C., electrolytic iron, 485
Tsegel'skii, V. L. *See* Sheinken, B. L.
Tseithin, L. A. *See* Pirogov, A. A.
Tsigler, V. D. *See* Smelyanskii, I. S.
Tsimmergakl, V. A., polarographic analysis, 508
Tsylev, L. M., iron-ore reducibilities, 105
Turich, M. L. *See* Zarubina, O. V.
Turkeltaub, N. M., determination of hydrocarbons in air, 252
Turnbull, L. A. *See* Toenges, A. L.
Turner, E. R., steel-foundry operations, 489
Turner, R. W. *See* Smoluchowski, R.
Turpin, G. *See* Aubry, J.
Tuttle, G. N., drying in porcelain enamelling, 240
Tweedy, J. M. *See* Saunders, H. L.
Tyurenkov, N. G., concentrating titanomagnetities, 102
Tyvaert, P., enamelling defects, 499

Uhlig, H. H., corrosion, 247
Uhlir, E., wart formations in burnt petrol tank, 253
Ulinski, B. I., trucks for strip coil, 237
Umanskii, M. M. *See* Bagaryatskii, Iu. A.
Umrikhin, P. V., slag formation in open-hearth, 231
Unckel, H. A., microhardness testing, 503
Underwood, L. R., cold-rolling plant, 368
Unwin, H. D., metallurgical waste liquors, 253
Uralskaya, A. V. *See* Afanasev, B. N.
Usatenko, Iu. I. *See* Plotkin, N. Z.
Usatenko, Iu. I., and **O. V. Datsenko,** determination of molybdenum in ferromolybdenum, 250
Uskova, O. N. *See* Pinkhusovich, L. L.
Ussar, M., swelling of bituminous coals, 103

Vainrub, L. G., firing grog in rotary kiln, 357
Vainshenker, I. I., and **Z. I. Granik,** analysis of surface-preparation solutions, 494
Valdman, V. L., and **A. M. Fomina,** comparison of viscometers for oil, 237
Valkenburg, H. E. Van. *See* Van Valkenburg, H. E.
Vana, C. A. *See* Bozsin, M.
Vanderploeg, E. J., cold-rolling sections, 237
Vandyshev, B. A. *See* Savitskii, F. S.
Van Valkenburg, H. E., theory of ultrasonic testing, 375
van Wijnen, G. J. *See* ter Berg, J.
Van Zante, R. D., T. R. Graham, and **R. G. Knickerbocker,** rutile electrodes, 492
Vasserberg, V. E., and **G. M. Zhabrova,** heater for gas-analyser tubes, 508
Vassiliou, B., refractories drying, 484
Vécsey B., extraction of iron from bauxite, 359
Veh, P. O., fuel consumption of forge furnaces, 234
Vennerholm, G. *See* Stevens, C. L.
Vennerholm, G., and **H. N. Bogart,** slag control in malleable-iron production, 363
Verein Deutscher Eisenhüttenleute, *Book*: "Gemeinfassliche Darstellung des Eisenhüttenwesens," 128
Vernon, W. H. J., corrosion of metals, 247
Verse, H., nomograms for X-ray exposures, 378

Veselovskaya, I. M., spectral analysis of ferrosilicon, 382
Viens, G. E. *See* Rogers, R. R.
Viets, F. H. *See* McCabe, L. C.
Villière, R., hazards with perchloric acid, 252
Vinarov, S. M., annealing properties of low-boron steel, 245
Vincent, K. C. *See* Dean, K. C.
Vincienne, H., Chaillac iron-ore deposit, 227
Vinogradov, N. I., carburization of molten steel, 106
Vitalesta, G., *Book*: "Forni Martin, Forni Ellettrici," 512
Vitális, I. Von. *See* von Vitális, I.
Vlodavskiĭ, I. S., paving blocks from blast-furnace slag, 360
Vodrázka, J., papers at Karlove Vary conference, 486
Vogel, H. U. von. *See* von Vogel, H. U.
Vogelsang, C. A. *See* Roberts, C. C.
Voice, E. W., radio-active determination of gas transit times in blast-furnace, 229
Voldrich, C. B., D. C. Martin, and **P. J. Rieppel**, steel electrode core wire, 492
Voltz, P., German steel-industry plant, 368
von Conrady, H., arc welding alloy sheets, 369
von Euw, M., X-ray analysis of slags, 231
von Graff, E., photomicrographs of structural changes, 123
von Vitális, I., coal resources in Hungary and Carpathia, 227
von Vogel, H. U., determination of iron and its oxides in iron ore, 381
Voronin, N. I., and **A. N. Novikov**, forsterite refractories, 357
Voronstov, R. V., photometric determination of vanadium, 250
Voysey, R. G. *See* Hughes, D. F.
Vyakhirev, D. A., *p*H meter, 509

Wagner, F. C. *See* Klier, E. P.
Wagner, G. E., electric stainless practice, 488
Wagner, H., anti-rusting properties of pigments, 113
Waite, R. G., stresses in welded castings, 107
Wakefield, J. E., metallizing, 113, 497
Walach, K., mechanized furnaces, 234
Waldschutz, F. J. *See* Thompson, F. R.
Walklate, E. J., blast-furnace stock-rod gas seal, 360
Wallace, D., effect of metal coatings on solder flow, 238
Wallace, J. F., effect of aluminium and vanadium on toughness of high-hardenability cast steels, 376
Wallace, J. F., and **J. L. Martin**, hot tears in centrifugally cast tubes, 364
Walter, L., automatic control of furnaces, 104; automatic temperature control, 104
Wanklyn, J. N., and **U. R. Evans**, effect of corrosion on thermal deposition of $CaCO_3$, 248
Warnock, F. V., and **D. B. C. Taylor**, yield under dynamic loading, 241
Warren, E. J., Tata "A" blast-furnace campaign, 104
Wasutowski, Z., roll utilization, 236
Water Pollution Research Board, pickling-waste treatment, 494
Waterfull, F. D., cyaniding salt baths, 235
Watkins, S. P., processing stainless steel wire, 494
Watt, W. *See* Roberts, J. P.
Weaver, E. R. *See* Ogburn, F.
Webb, C. L. A., annealing-plant design and operation, 87
Webber, B. N. *See* Lasky, S. G.
Weill, G. F., metal polishing, 111
Weisberg, H., cyclic heating test of pipe joints, 119
Weiss, S. J., calculation of static bend strength, 241
Welander, E., properties of core sands, 107
Wells, F. G., C. T. Smith, G. H. Rynearson, and **J. S. Livermore**, Californian chromite deposits, 481
Welter, G., dynamic torsion of aircraft metals, 121; fatigue strength of spot welds, 493
Welter, H., rotary-furnace sintering, 356
Wendelburg, F. W. *See* Blum, F. M.
Went, J. J., ferromagnetic materials for cyclotron cores, 242
Wentrup, H., and **H. Schrader**, primary crystallization, 247
Werner, M., H. Tietz, and **H. List**, corrosion damage in boilers, 248
Wert, C. A., precipitation in α-iron, 505
Wesemann, F., and **K. Kessels**, errors in blast-furnace materials balances, 229
West, D. F. R., *Paper*: "The Mechanism of Solidification of Horizontal Steel Castings," 182, 489; biographical note, 224
West, W., core-blowing, 233
Weyrauch, H., corrosion damage in boiler, 248
Whalley, H. K., petroleum products as bonding agents, 232
Whalley, W. C. R., cathodic protection of Iraq pipelines, 507
White, A. E. *See* Freeman, J. W., *also* Reynolds, E. E.
White, H. C., Williams Prize award, 476
White, J., core bonding, 232; *see also* Ford, W. F.
White, W. H., and **A. R. Alsea**, growth of cast iron, 364
Whitehead, E., open-hearth automatic control, 106
Whiteley, J., *Paper*: "The Extension of the Ar_1 Range with Carbide Formation in Mild Steel Due to High-Temperature Treatment," 399
Whiting, L. R., synthetic-resin coatings, 112
Wickert, K., and **H. Pilz**, dissolution of metal powders in HCl, 248
Wiegand, D. E., testing magnetic recording media, 375
Wijnen, G. J. van. *See* van Wijnen, G. J.
Wilcox, R. J., oxygen in stainless-steel production, 487
Wild, R. *See* Saunders, H. L.
Will, G., carburizing sintered parts, 370
Willan, J. H. G., copperas required in recovery of pickling liquor, 86
Willi, A. B., jun., sleeve bearings, 369
Williams, A. E., metal spraying, 113, 497
Williams, A. J. *See* Royer, M. B.
Williams, C. H., annealing-plant design and operation, 90
Williams, R. E. H., annealing-plant design, 90
Williams, W. J., *Paper*: "The Influence of Low Percentages of Certain Elements on the Microstructure of Pure Iron–Carbon Alloys and Cast Irons," 407; biographical note, 477
Williams, W. L., effect of metallizing on fatigue properties, 373; tests on free-machining steels, 501
Willot, R. L., effect of oils on annealing, 87
Wills, T. G. *See* Diehlman, G.
Wilson, H. C., titanium enamels, 498
Wilson, I. F., and **V. S. Rocha**, Mexican coal deposits, 481
Wilson, W. M., W. H. Munse, and **W. H. Bruckner**, fatigue strengths of welded joints, 369
Wiltshire, W. J., radiographic inspection standards, 119
Winfield, O., mechanization in brick-making, 228
Winning, J., hardness testing, 116
Winsor, L. P., L. McD. Schetky, and **R. A. Wyant**, welding-arc instrumentation, 492
Wise, D. A., biographical note, 477
Wise, D. A., and **L. N. Bramley**, *Paper*: "A Proposed Method of Specifying Travel-Motion Performance for Steel-works Overhead Cranes," 439
Wistreich, J. G., back-pull wire drawing, 235
Withers, R. M. J., *Paper*: "A Wire-Drawing-Die Profilometer," 63, 492; biographical note, 95
Witschey, R. A., annealing-furnace refractories, 358
Wlodek, T. *See* Cavanagh, P. E.
Wolf, H. G., protective coatings, 113
Wolfson, D. E. *See* Davis, J. D.
Wolthorn, H. J. *See* Herdle, A. J.
Wood, G. A., manufacture of electric stee in Great Britain, 167
Work, C. E. *See* Dolan, T. J.
Wormwell, F., and **D. M. Brasher**, *Paper*: "Resistance and Capacitance Measurements on Painted Steel Immersed in Sea Water," 141, 499
Worrilow, W. H., foundry developments, 233
Wragge, W. B., *Paper*: "The Disposal of Spent Acid Pickling Liquor." *Discussion*, 85
Wright, R. H., high-speed rolling mills, 237
Wucherer, J., large-scale production of oxygen, 383
Wullhorst, B. *See* Raub, E.
Wüstefeld, A., phosphatizing, 498; sorption by phosphate coatings, 498
Wyant, R. A. *See* Winsor, L. P.
Wyllie, D., and **G. C. N. Cheesman**, sodium nitrite as sea-water-corrosion inhibitor, 380
Wyman, C., E. J. Goehring, and **C. A. Faist**, oxygen in electric steelmaking, 487

Yakutovitch, M. V. *See* Rybalko, F. P.
Yamaguchi, S., electron-diffraction study of corrosion on Hastelloy, 124
Yancey, H. F. *See* Geer, M. R.
Yanko, W. H. *See* Harris, J. C.
Yarov, I. A. *See* Bernshtein, M. L.
Yavoskiĭ, V. I., transfer of gases to meta through slag, 230
Ydstie, B. *See* Christiansen, H., jun.
Young, H. A., deoxidizers in electric steelmaking, 487
Yousef, Y. L., measuring Young's modulus by transverse vibrations, 240

Zagorodskikh, D. M., cracks in impact testing, 241; low-temperature brittleness under stress, 241
Zahn, E. A., spray painting, 113
Zaitsev, G. P., Brinell-hardness/plasticity relationships, 116
Zaitsev, N. D. *See* Gintsburg, Ya. S.
Zakharov, I. A. *See* Savitskii, F. S.
Zan, E., production of cast iron from steel scrap, 359
Zante, R. D. Van. *See* Van Zante, R. D.
Zarubina, O. V., and **Turich, M. L.**, temperature and humidity factors in corrosion, 249
Zbigniev, J., Zaprostal rolling mills, 236
Zelders, H. G., corrosion in coal washeries, 249
Zener, C., growth of spherical precipitates, 505
Zeuner, H., and **K. Roesch**, moulding-sand behaviour, 490
Zeyen, K. L., welding rods and techniques, 237
Zhabrova, G. M. *See* Vasserberg, V. E.
Zhdanova, N. V., assessment of moisture in gas, 252
Zhigach, K. F., rotating-cone viscometer, 237
Zhilin, A. I., fluidity of blast-furnace slags, 360
Zhmudskii, A. Z., crystal-lattice constants, 505
Zhukov, S. L., determination of fatigue strength with high stresses, 373
Zimnawoda, H. W., foundry mechanization, 365
Zoja, R., non-metallic inclusions in ferro-chromium, 123
Zorev, N. N., machining heat-resisting steels, 111
Zuppan, E. C., and **A. E. Martin**, spectrographic analysis of acid slags, 381
Zuschlag, T., magnetic testing of steel, 375.